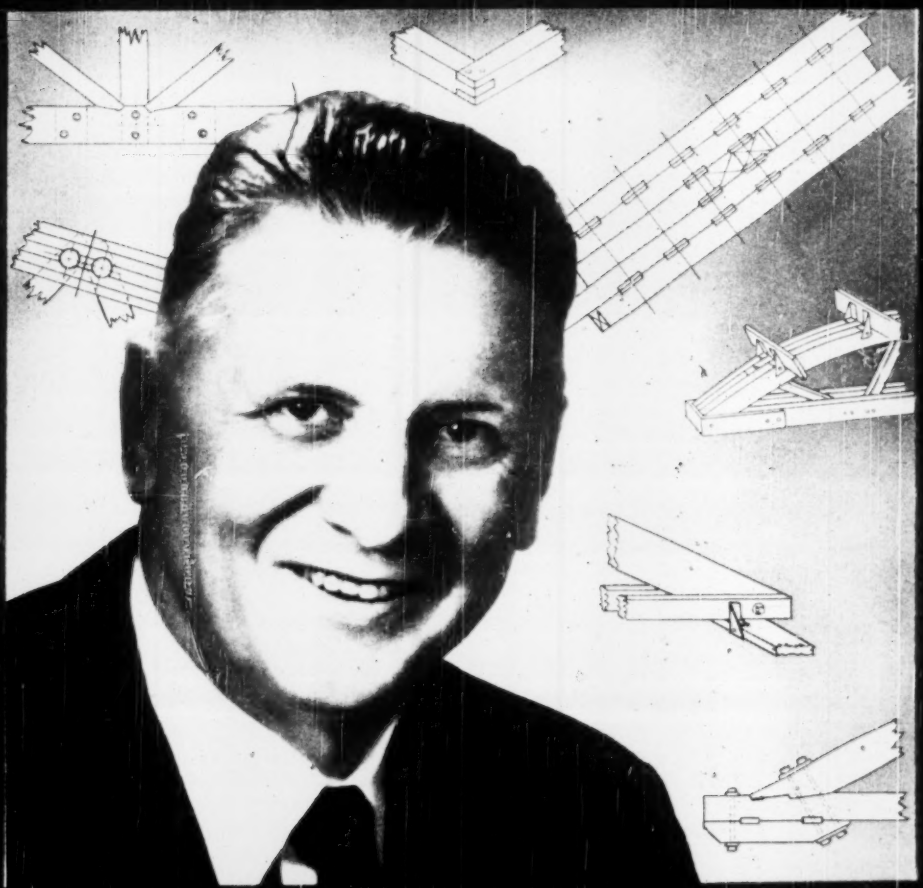
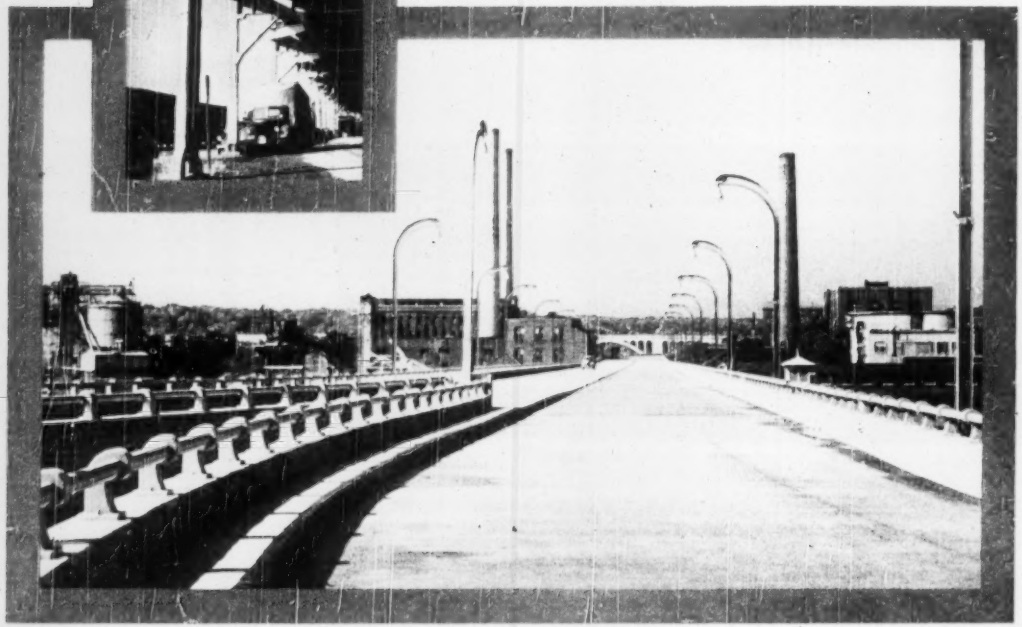
ENGINEERING NEWS-RECORD



A McGRAW HILL PUBLICATION

THESE ATTRACTIVE RAILINGS SAFEGUARD TRAFFIC—AND BYERS WROUGHT IRON SAFEGUARDS THE RAILINGS!



This view of the K Street Elevated Highway, Washington, D. C., shows what designers can do to make railings attractive as well as practical —and the specifications show what designers can do to make railings durable. Harrington & Cortelyou, the engineers, specified wrought iron for the project. Byers 4-in. Wrought Iron pipe was installed for the railings by the general contractors, Alexander & Repass. As a further safeguard, Byers Wrought Iron 8-in. pipe was installed for the ram loaders, one is shown in the smaller illustration.

This job is typical of the new approach to the problem of bridge railings, which has been gaining in favor for over a decade. The old designs, which masked the view as completely as if motorists were traveling through a tunnel, have been abandoned for new designs which give full visibility. The old materials, which depended on frequent and periodic painting and maintenance for protection, have been supplanted by Byers Wrought Iron, which is inherently resistive to corrosion. If, for any cause, the scheduled painting must be deferred, the life of these wrought iron railings is not threatened.

There is a very definite reason why wrought iron endures in these applications. Tiny fibers of glass-like silicate slag, threaded through the body of high purity iron, halt and disperse corrosive attack, and so discourage pitting. The fibers also anchor the initial protective scale, which shields the underlying metal.

You will find several interesting railing treatments developed from standard Byers Wrought Iron tubular and hot rolled shapes in our bulletin, WROUGHT IRON FOR BRIDGE CONSTRUCTION. You will also find some other applications for the material which help to safeguard bridges against premature repairs and excessive maintenance. We will be glad to send you a copy on request.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, San Francisco. Export Division: New York, N. Y.

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finest for flotation, rolling big loads faster.
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ENGINEERING NEWS-RECORD

Volume 145 JULY 6, 1950 No. 1

WALDO G. BOWMAN
Editor

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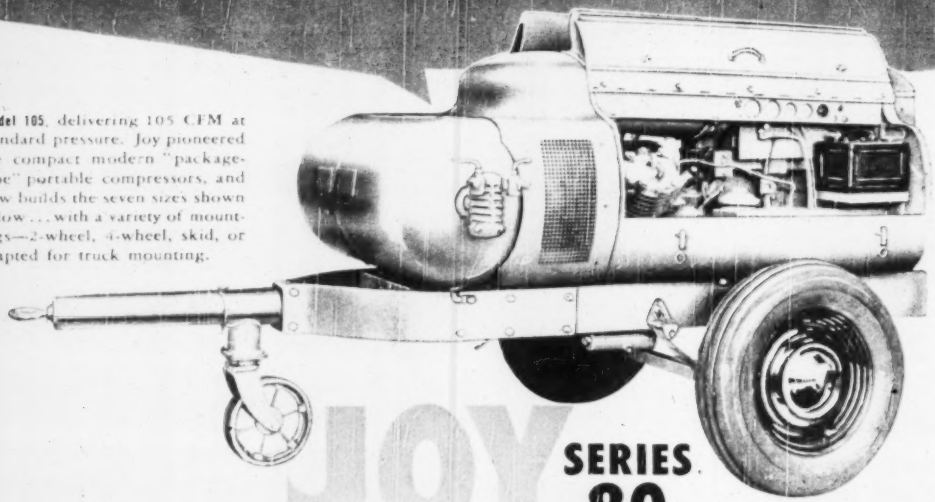

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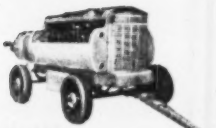
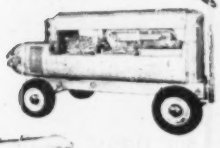
SEVEN SIZES—60 TO 630 CFM

NOTHING TO MATCH THEM FOR MODERN, COMPACT DESIGN—PORTABILITY—RELIABLE AND EFFICIENT OPERATION





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MASTER "99"—combining the best features of the "99-H" with the extra power, traction and road speed of its 100 horsepower engine.

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3-WHEELED . . . TANDEM

3-WHEELED ROLLERS with hydraulic scarifiers. TANDEM ROLLERS of the variable weight type. All with gas or diesel engines.

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The ¾-swing Badger wastes no power swinging extra weight; makes more swings per hour; can work in closer quarters.

Advanced engineering and honest construction characterizes each Austin-Western product. Your nearby A-W distributor will gladly recommend the one best suited to your needs.

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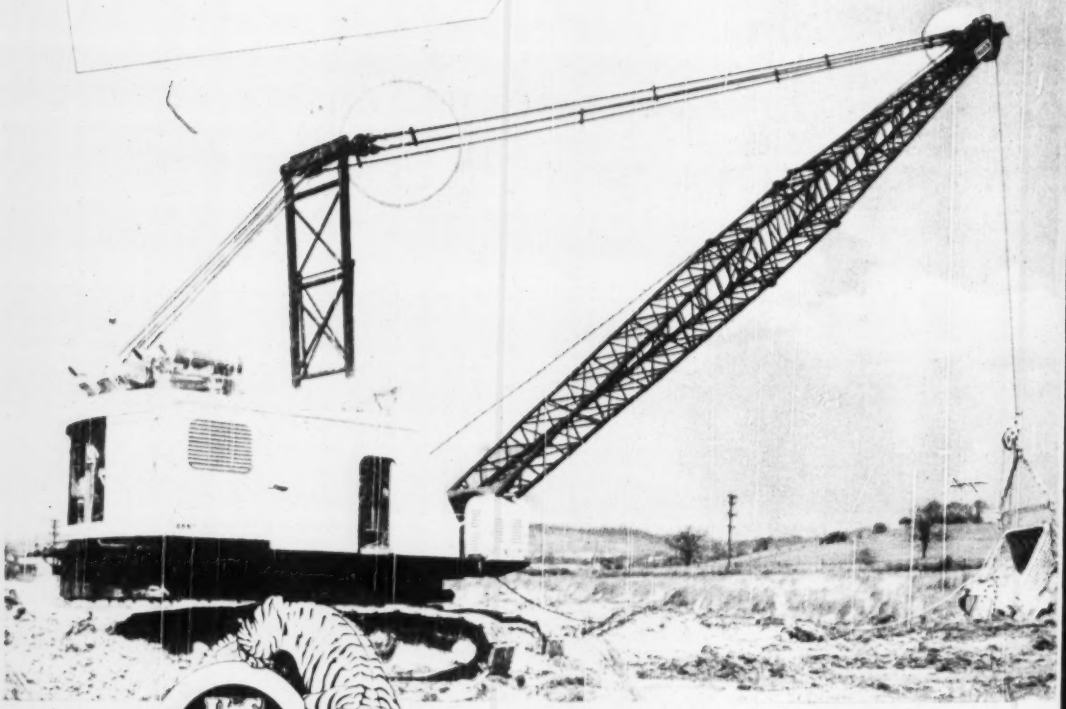
REPLACE YOUR OLD BOOM SUPPORTS with these new Tiger Brand FATIGUE-RESISTANT Boom Support Assemblies. Field tests and laboratory vibration tests indicate at least two or three times the usual length of life under the most severe vibration conditions.



NEW TIGER BRAND FATIGUE-RESISTANT BOOM SUPPORT ASSEMBLIES on a 5 cu. yd. dragline near Pittsburgh, Pa.

USS AMERICAN TIGER BRAND WIRE ROPE UNITED STATES STEEL

life for boom supports

Tiger Brand Cable Assemblies

● Here is an "innovation" in boom support assemblies that effectively combats the most severe vibration on power shovels, draglines and cranes. Notice the novel thimble design which embodies an interwoven eye and open end pendant easily and quickly interchangeable on standard equipment.

This new design dampens vibration instead of concentrating it at one point. The result is two to three times longer life for boom supports and much greater safety.

The new boom supports are especially adaptable to installations where fatigue failures occur adjacent to sockets. They can be easily and quickly adapted to your present equipment because essential dimensions such as pin diameters, distances between ears, etc., are the same as for standard open and closed sockets.

Fatigue-Resistant Boom Supports are an exclusive development of American Steel & Wire Company. Send the coupon for complete information.

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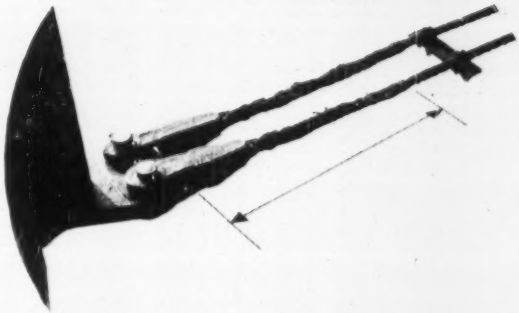


VIBRATION EFFECTIVELY DAMPENED HERE over a long section instead of being concentrated at one point.

American Steel & Wire Company
Rockefeller Building, Dept. A-70
Cleveland 13, Ohio

Please send me complete information on your new Tiger Brand Boom Support Assemblies.

Name.....

Title.....

Company.....

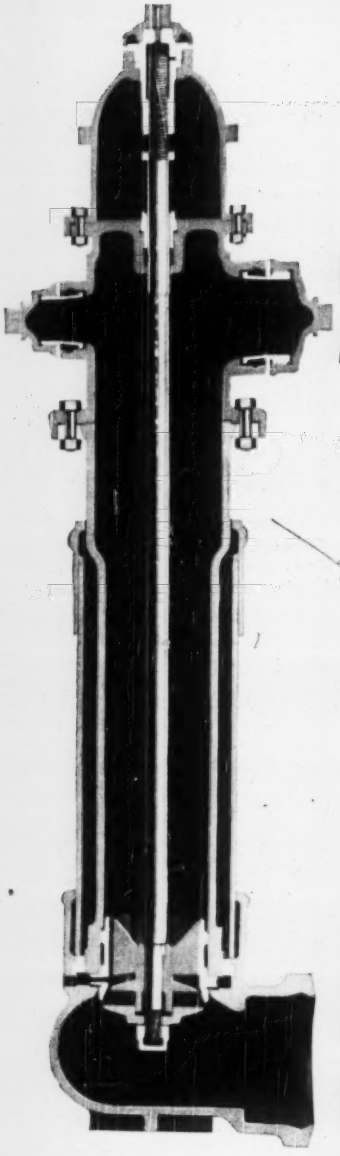
Address.....

City.....State.....

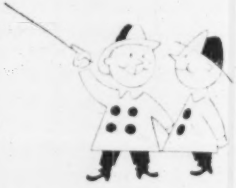
AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL



FEWER WORKING PARTS MEAN GREATER DEPENDABILITY



The simplicity of construction of Mathews Modernized Hydrants is an important factor in their length of service. There are Mathews Hydrants in operation today that were installed over 70 years ago.

MATHEWS HYDRANTS

Made by R. D. Wood Company

Public Ledger Building, Independence Square, Philadelphia 5, Pa.

Manufacturers of "Darling" Pipe (centrifugally cast in cast-iron) and R. D. Wood Gate Valves

MATHEWS MODERNIZED HYDRANTS SET THE PACE: All working parts contained in replaceable barrel • Stuffing box cast integral with nozzle section • Head can be turned 360° • Replaceable head • Nozzle sections easily changed • Nozzle levels raised or lowered without excavating • Protection case of "Sani-Spun" cast iron for extra strength, toughness, elasticity • Operating thread only part to be lubricated • Modern barrel serves as old Mathews good as new

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Raymond

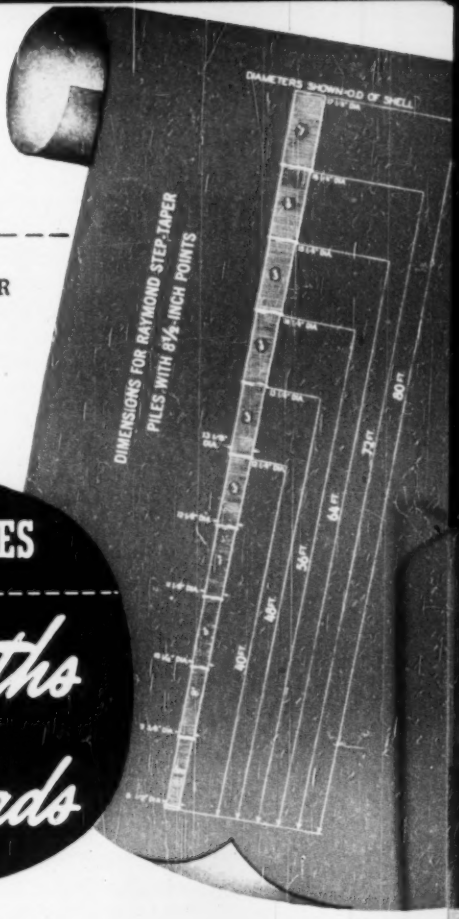
MAKES 5 TYPES OF CONCRETE PILES

1. STANDARD . . . 2. STEP-TAPER . . . 3. PIPE STEP-TAPER

4. COMPOSITE . . . 5. GOW CAISSONS

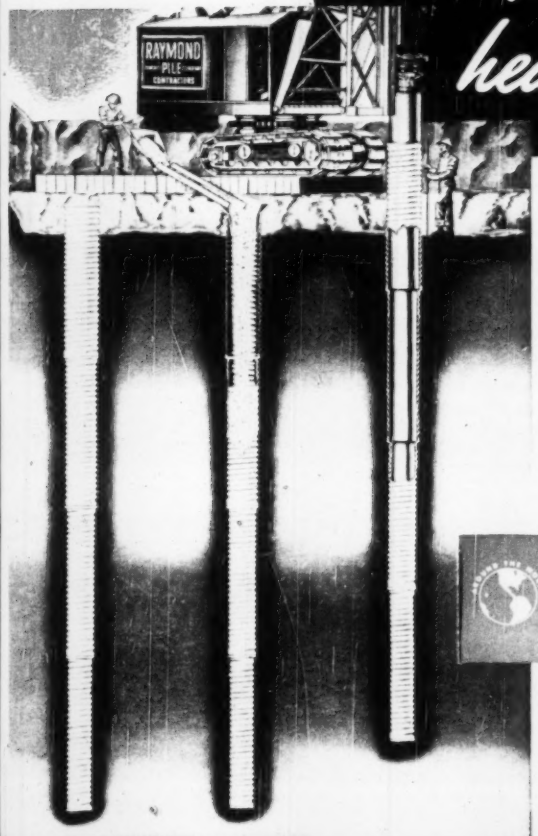
Raymond installs every type of pile: cast-in-place concrete, precast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements, also cement mortar lining of pipes by the Centriline Corporation, a Raymond Subsidiary.

At left, completed Step-Taper Pile. Center, filling the permanent steel shell with concrete after internal inspection. Right, driving the pile with rigid core.



2. STEP-TAPER PILES

FOR *long lengths* WITH *heavy loads*



Raymond Step-Taper Concrete Piles driven with rigid steel cores and heavy hammers are designed to develop high load-carrying capacities at depths to 80 feet. The permanent steel shell maintains the resistance developed during driving. After the shell is inspected internally, it is filled with concrete and cut off at the specified elevation.

You are invited to discuss with our engineers the efficiencies and savings made possible by Raymond's exclusive, original concrete pile designs.

◀ RAYMOND PILES MAINTAIN DRIVING RESISTANCE

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Clintonville, Wisconsin
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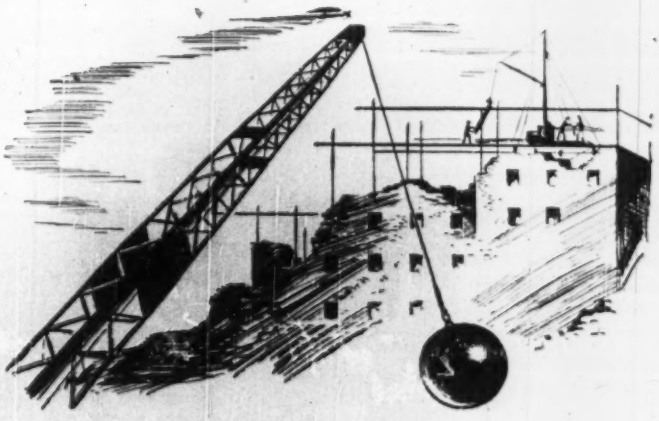
America's Foremost Heavy-Duty Truck

Roebling Preformed Long Lay "Blue Center" Steel Wire Rope lasts longer; brings fewer shut-downs; cuts down replacement time; saves wire rope dollars



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Take Roebling Preformed "Blue Center" Wire Rope with Independent Wire Rope Core!

No finer rope has ever been made, and its basis is "Blue Center" steel—an exclusive Roebling development. Its high resistance to abrasion, and added fatigue spells long life . . . To this, Roebling *Preforming* brings the added advantages of new handling ease and improved performance . . . And the addition of I.W.R.C. assures top resistance to operating pressures and provides increased rope strength.

Roebling makes a wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebling Field Man recommend the best rope for low cost operation on each of your installations.

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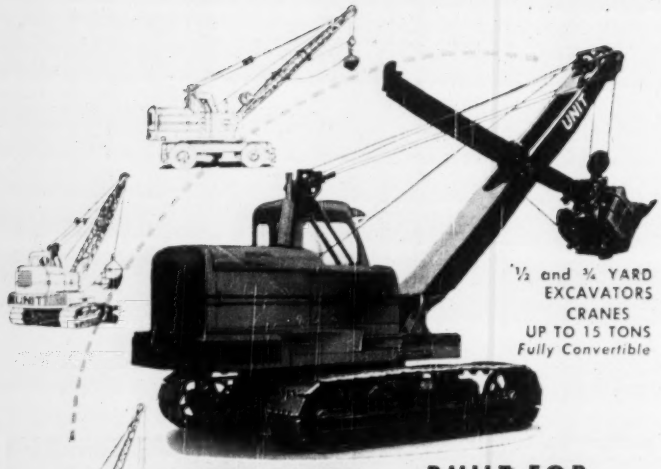
JOHN A. ROEBLING'S SONS COMPANY, TRENTON 2, NEW JERSEY



½ and ¾ YARD
EXCAVATORS
CRANES
UP TO 15 TONS
Fully Convertible

UNIT BUILT FOR ALL-AROUND *Heavy-Duty Service*

UNIT is tough! UNIT is versatile! That's why you can use UNIT on any type of job requiring shovel, clamshell, magnet, dragline, trenchoe, grapple or backfiller. And it's easy to change from one attachment to the other, right on the job. UNIT gives you all the power and speed you need, plus these exclusive features: Automatic traction brakes . . . Disc type clutches . . . Drop forged alloy steel gears . . . Splined shafts . . . One piece cast gear case . . . Straight line engine mounting.

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FULL VISION CAB for GREATER SAFETY

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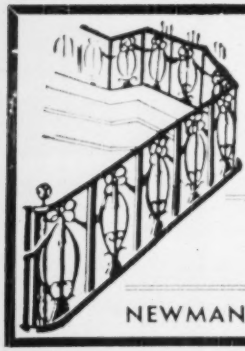
SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • TRENCHOES • MAGNETS



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ORNAMENTAL BRONZE,
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NEWS BRIEFS

Light Sentence—A Chicago court has prohibited the driving of piles at night on a $12,000,000 research hospital job, for the VA, on Chicago's north side. The company said it worked "round the clock because it had to finish the 17-story structure in 650 working days." The judge suspended a $200 fine on a promise that no more piles would be driven at night.

Any Room for Motorists?—Pennsylvania awarded 255 highway construction contracts during the first five months of 1950. They call for 488 mi of road at a cost of $88,302,454. The Highway and Bridge Authority awarded 11 more during that time, calling for 33 mi of improvements at $22,585,000. And there were to be 50 more contracts let in June.

Still At It—Connecticut's Gov. Chester Bowles has signed a contract authorizing a $50,000 survey of the New London-Groton area as a possible site for a New England steel mill. The state's Commission on Steamship Terminals, which advanced the funds, and the New England Steel Development Corp. were parties to the contract.

Nice Try, Anyway—New Jersey's Passaic Valley Sewerage Commission thought it had something for a short time recently. It heard a report on preliminary tests of a new chemical which removed 98.4% of the bacteria contained in sludge samples from its system. It figured the new substance might enable it to bypass extensive secondary treatment facilities and save heavy investment and operating costs. But it turned out that the chemical only kills bacteria—does nothing about color, gassing and suspended particles.

Don't Get Sick, Though—Texas has embarked on the first $6,000,000 stage of a $35,000,000 state hospital building program. This step is to be completed by September, 1951. Planning now will shift to the remaining $29,000,000 as work progresses.

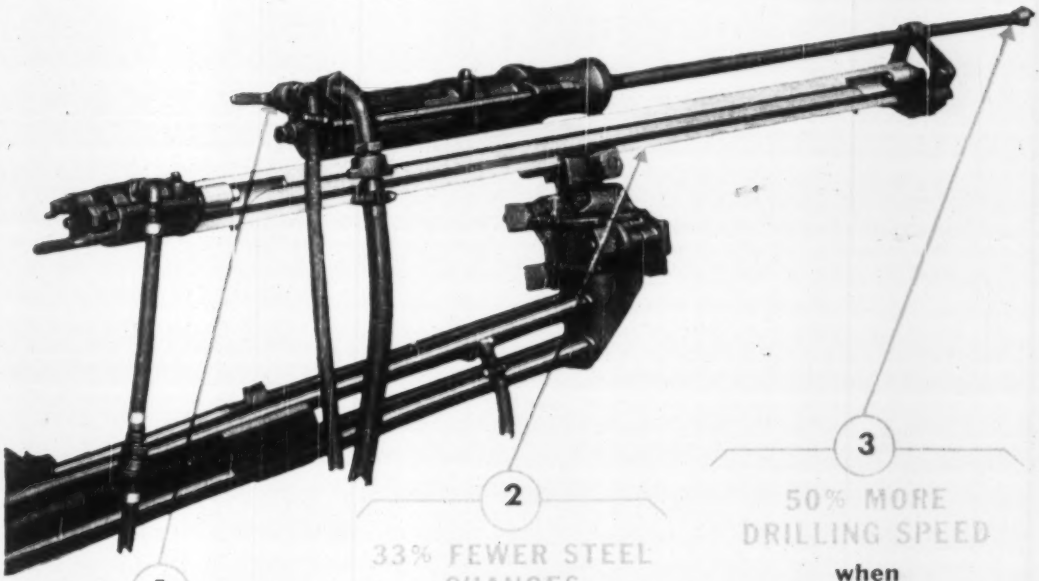
Municipal Financing Made Easy—Honolulu is spending $125,000 to create $6,500,000 worth of property. It's half done with a seawall behind which it ultimately will fill 50 acres. The new land will adjoin an industrial-midtown section. The city figures the land will be worth $5 per sq ft. Might as the rock for the seawall has come free excavated at the site of the fu-

Continued on page 14

THIS NEW

DB-35 DRIFTER and 48" ALUMINUM SHELL

SAVES THREE WAYS!



1

28% LESS AIR
with the NEW DB-35 Drifter

Ingersoll-Rand's new DB-35 Drifter, with the patented double-kicker port valve, has been especially designed to increase operating economy. Tests prove that this new drifter actually requires 28% less air per foot of hole drilled! What's more, the new design has resulted in stronger rotation, better hole cleaning ability and improved feeding qualities. These combined features give you a rugged, heavy-duty drifter that will even surpass the record-breaking performance of Ingersoll-Rand's famous DA-35 Drifter.

2

33% FEWER STEEL CHANGES
with the NEW Lightweight 48-inch Aluminum Shell

The greater length of this new shell permits the use of longer drill steels—with 33⅓% fewer steel changes for a given footage. Its light weight all-aluminum construction cuts shell weight almost in half! In fact, it's even lighter than the old style 36-inch steel shell and has equal or better life. This light weight is particularly important when drilling from a column of bars.

3

50% MORE DRILLING SPEED
when Carset Jackbits are used

These longer wearing, faster-drilling Carset Jackbits, tipped with tungsten carbide, enable you to take full advantage of the potential savings offered by the new I-R drifter combination. Often drilling speeds can be increased by 50% or more, tonnage can be boosted 20% or better and dynamite requirements can be cut as much as 30%. These savings, together with the many other proved advantages of I-R Carset Jackbits, set an all-time high in economy and performance.

THIS combination is ideal for use with the famous I-R Drill Jumbo Mounting. For complete information check with your nearest Ingersoll-Rand office today. Let our engineers tell you more about this new cost-cutting combination.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N.Y. 499-5

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CONDENSERS • CENTRIFUGAL PUMPS • OIL & GAS ENGINES

CARSET JACKBIT

WATER BOY... *1950 Model*

When it comes to handling water, you can depend on Naylor Pipe to do a better job.

Naylor's light weight makes it easier to handle and install. The extra strength of Naylor's exclusive Lock-Seam Spiralweld structure makes it safer and tougher—superior to ordinary lightweight pipe for the tough going on construction jobs.

Another Naylor feature on the water project illustrated here is the use of Naylor Wedge-Lock Couplings which contractors have found to be the fastest and easiest method of connecting pipe.

Look into this combination of pipe and couplings for your jobs whether they require water lines, "high" air lines, irrigating lines, cement pumping pipe, dredging, hydraulic sluicing, sand and gravel conveying, and other services calling for pipe from 4" to 30" in diameter.

Write for Catalog No. 44

NAYLOR PIPE COMPANY
1248 East 92nd Street, Chicago 19, Illinois
New York Office: 350 Madison Avenue, New York 17, N. Y.

(Continued from page 12)

cently completed "punchbowl" National Memorial Cemetery of the Pacific.

Fish Story? A company has been formed to build and operate what is described as the world's first ocean-going natural gas pipeline. It'll handle gas from Gulf of Mexico tidelands. Mining Gathering Co. will build the line from water's edge in Vermilion Parish, La., 10 mi out to sea to the Pure Oil Co.'s drilling platform. It's to be an 8⅝-in. dia line with a daily capacity of 50,000,000 cu ft. It's to be finished late this fall, be on a ditch below the ocean floor and be given special salt-water protective treatment.

Have a Drink. New York State's Water Power and Control Commission has ok'd an application by the Latham Water District for a 3.4 billion gal reservoir on Stoney Creek in Clifton Park. Cost is estimated at $1,025,000.

Not in Boston. Plans and estimates for a 1,400-ft traffic tunnel through Bunker Hill have been ordered by Los Angeles city council. Preliminary plans call for either three or four lanes, although parallel existing tunnels have two. It would cost about $3,000,000, including a viaduct on the west to connect with the New Hollywood Freeway.

THE COVER

The distance between one of the world's great testing laboratories for research into wood and its uses and the presidency of the top society for testing and standardization of materials generally isn't a long step for L. J. Markwardt.

Seated last week as president of the American Society for Testing Materials, Markwardt has long been associated with wood engineering research. He joined the U. S. Forest Products Laboratory in 1947, and is now its assistant director.

A civil engineering graduate of the University of Wisconsin (1912), Markwardt served as assistant city engineer of Madison, and later joined the engineering faculty of the university. During the last war, he served (among other things) as a member of an aircraft mission concerned with information on design and construction practises in the wood and plastic fields, and directed the laboratory's greatly expanded engineering program for the armed services.

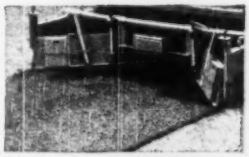
His work has not been entirely with wood. He is co-author of a book on descriptive geometry, and author of many technical papers on other engineering subjects.

JAEGER paver-type AGGREGATE SPREADER

the low-cost, accurate, self-propelled spreader you've been looking for

ALL TRACTION ON SUBGRADE or compacted course. No displacing of loose material. 4-wheel drive.

STRAIGHTEDGE RUNNERS carry screed independent of rest of machine, average out subgrade irregularity, insure accurate lay.



LAYS MANY MATERIALS: The Jaeger is adaptable for free-flowing bituminous mixes as well as all aggregates up to 4" stone.

UP TO 25' IN TANDEM: Use 2 low-cost spreaders to lay and roll full-width base. Keep your costlier paver busy on top course.

BLENDS PERFECT JOINTS: Side control gates furnish material for blender wings to form joint. Saves hand work.

QUICK WIDTH CHANGES, 10' to 12½' by simply cranking telescopic shaft, adding screed inserts. Block off for 8' to 10' widths.

ALL AGGREGATES, both base and surface, plant-mixed stabilized soil and free-flowing bituminous mixtures — up to 10" thickness, 8' to 12½' widths. Lays big daily tonnage, to correct course thickness —yet is low in cost.

Contractors, highway engineers, send for new Bulletin SPS-9.

JAEGER BITUMINOUS PAVER "Teams" with the Jaeger Aggregate Spreader: America's most advanced precision paver for all types of bituminous material. Oscillating tiltable screeds, almost instant width adjustability up to 12½', positive automatic leveling. Paves flush to curbs, gutters. All traction and heavy load confined to subgrade. Ask for Catalog BP-9.

CONCRETE PAVING CONTRACTORS: Get labor-saving mass-production with Jaeger Diagonal-Screed Finisher and Screw Spreader "Team". Ask for catalog.

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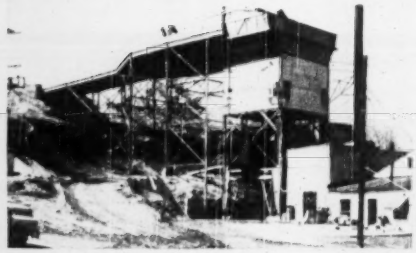
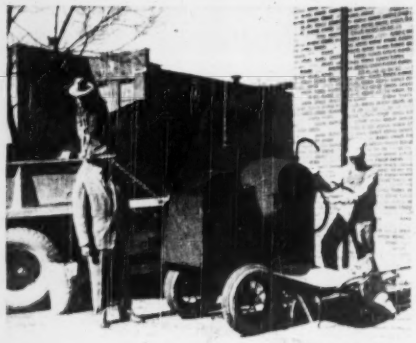
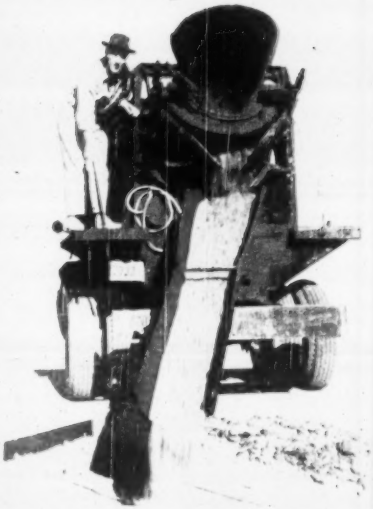


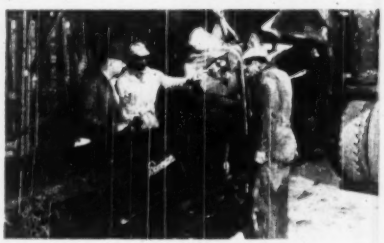
FOR CENTRAL MIXING This modern plant of the Clark Certified Concrete Company, Inc., of Baltimore, Md., produced 125,000 yds. of pre-mixed concrete during the past year. Vice-President Duncan writes: **"Your Blue Brute 84-S Stationary Mixer has proven entirely satisfactory. Maintenance costs have been practically nothing."**



FOR PORTABLE MIXING. Le Roy W. Vival, chief engineer of the O'Sullivan Rubber Corporation, Winchester, Va., reports: **"We are extremely gratified by our Blue Brute 3½S Tilting Mixer, which has had two years of constant, severe use. It is extremely mobile, well constructed and performs excellently. Long exposure has not decreased its efficiency. The mixing cycle is fast and the mix consistently uniform. It is a pleasure to endorse and recommend this equipment."**



FOR TRANSIT MIXING. President Bob McCorkle of the Abilene, Texas, Concrete Company, gives his reasons for re-ordering Blue Brute Hi-Up Truck Mixers. **"We have compared competitive makes on our jobs and find your Hi-Ups best in every way. Maintenance costs have been negligible. Just purchased your first chain-drive Hi-Up and find it even better than the older machines — faster charging and discharging, easier to maintain and smoother running."**



FOR PLACING. In building the Washburn vehicular tunnel under the Houston, Texas, ship channel, the "Trench method" of construction was used. The last yard or two of concrete placed in each of the section joints had to be placed straight upwards — a tricky pouring problem. Merritt-Chapman & Scott Corporation reports **an easy solution was found with the aid of a Blue Brute Pneumatic Placer, which performed excellently.**

Yes, among Blue Brute owners it's a never-ending story of more concrete at lower cost, trouble-free operation, time and money saved in every detail of mixing operations. Why not look into this proof that *there's more worth in Worthington?* See your nearby Worthington-Blue Brute Distributor, or write for bulletins on mixer types in which you're interested.

NATIONAL READY MIXED CONCRETE ASSOCIATION NRMCA

Worthington Pump and Machinery Corporation
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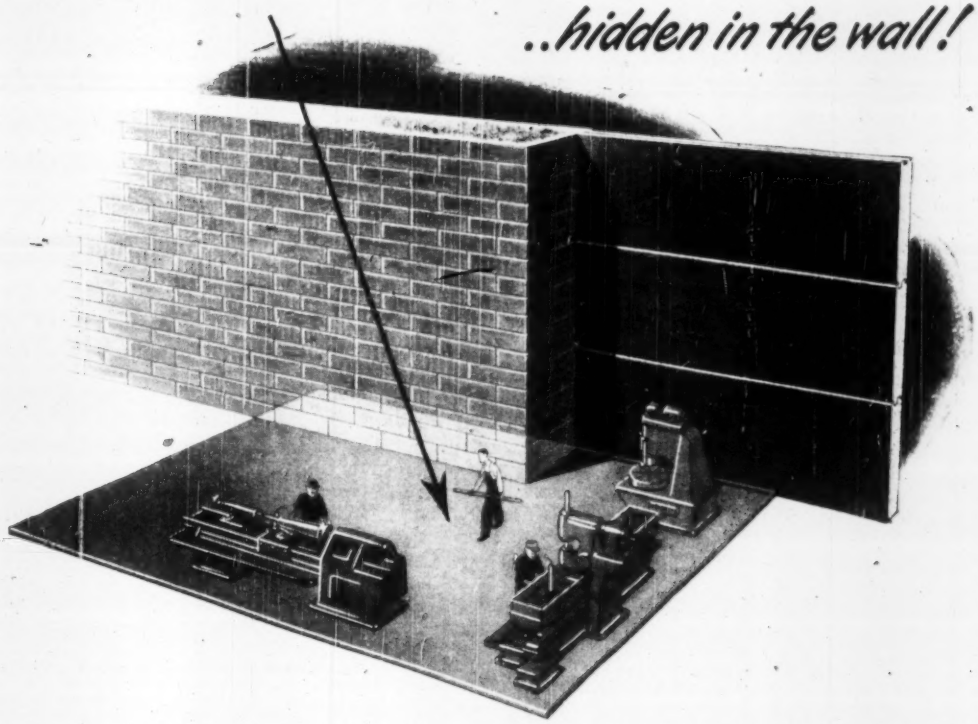
BUY BLUE BRUTES

80-4

IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

FOUND 602 sq. ft. of floor space ..hidden in the wall!



It was a small plant Mr. Williams was building—150' x 250'. Instead of the usual 12" thick wall of brick, an alert young engineer suggested the new 8"-thick, insulated Fenestra* "C" Panels he'd heard so much about. Same function . . . same insulating value . . . same outside building dimensions. But *inside*—602 sq. ft. more floor space than he'd have had with the old-style wall. Floor area equal to a 20' x 30' room.

He also discovered:

That the installation speed of these panels cut construction costs . . . helped get equipment under cover quickly.

That they are lightweight, strong . . . reducing requirements for structural steel.

That they are noncombustible.

That they are good-looking and so smooth that dirt and grease can't get a grip.

And he *will* discover, when he wants to expand, that they are easily dismantled, moved and reinstalled.

Fenestra Insulated "C" Panels are standardized 3" deep, 16" wide, 18 gage painted steel or 16 B&S gage aluminum, 6' to 14' in length. These of steel weigh only 6.50 lbs. per sq. ft. Aluminum, 3 lbs. Two formed members, joined to form a structural unit. Asphaltic impregnated felt inside full length of the joints to prevent metal-to-metal contact. Vapor-sealed, with felt stripping between formed sides and end closures. Double tongue and groove joints make a wall of "C" Panels an integral load-bearing unit. 5 positive bearing surfaces per panel for easy erection. Smooth surface permits easy flashing details.

Check into Fenestra "C" Panels right away . . . they save you time, money and *won't* waste floor space.

Mail the coupon, or have one of our engineering representatives call. Also ask about "D" Panels for floors and ceilings, and Holorib Roof Deck. *Trademark

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Please send me, without obligation, information on Fenestra Building Panels.

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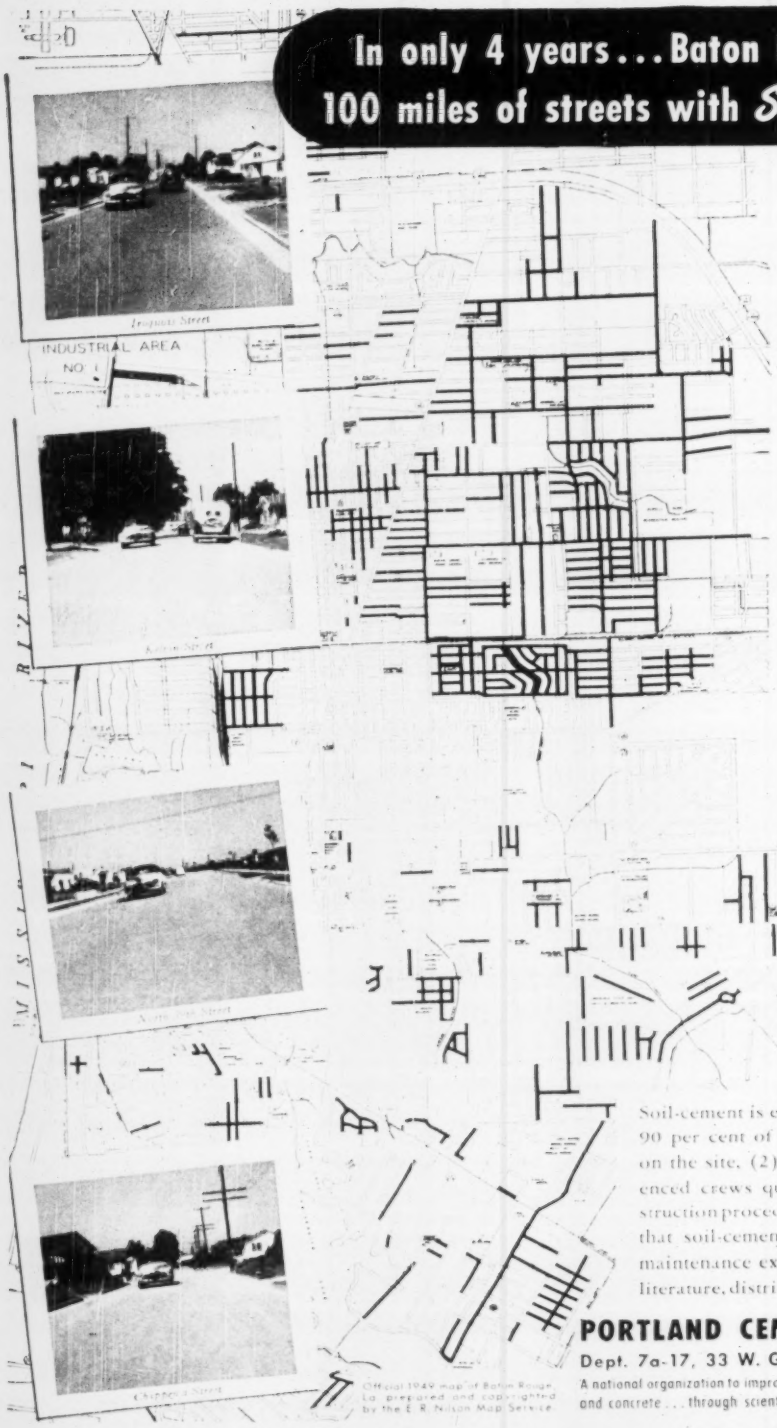
In only 4 years... Baton Rouge paves 100 miles of streets with *SOIL-CEMENT*



IN EACH of the last four years (1946 through 1949) Baton Rouge, La. has led all cities in the U.S. in soil-cement paving. During that time the city paved more than 1,000,000 sq. yd., or about 100 miles of streets with low-cost, durable soil-cement.

The heavy black lines on the map show where these soil-cement streets are. The pictures superimposed on this map are typical streets in this tremendous soil-cement paving program.

Like Baton Rouge, cities, counties and states across the nation are finding that soil-cement is the economical way to get dependable, all-weather pavement on light-traffic roads and streets.

Soil-cement is economical because (1) about 90 per cent of the required material is soil on the site, (2) paving is fast, (3) inexperienced crews quickly learn the simple construction procedures. Published records show that soil-cement gives long service at low maintenance expense. Write for informative literature, distributed only in U.S. and Canada.

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A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

THE CONSTRUCTION WEEK

FREE VS FEE—Governor Thomas E. Dewey's plan for a rather complicated system of toll-charges on New York's Thruway (ENR March 9, p 21) is going to come in for some hot and heavy fighting. The Automobile Club of New York (231,500 members) through its president, W. J. Gottlieb, pledged an "all-out" fight against any such charges. Said Gottlieb: "There are many sound reasons for believing that the Thruway cannot be put on a self-supporting basis by license fees on users. . . . We are unalterably opposed to financing the Thruway by tolls as long as special taxes on motorists are diverted to non-highway purposes."

WAGES STILL UPGRADING—The trend is still up in wages: It is fed by the General Motors four-cent increase and the cost-of-living escalator in that contract. The latest Bureau of Labor Statistics price index of 168.6 means a 2-cent raise in September (if there's no drop before then). The first real sign of the size of any fifth-round wage demands will appear when Phillip Murray reopens the Big Steel contract Jan. 1. The $22-a-month the social security law amendments cut from the industry's pension obligations will be Murray's biggest bargaining point.

ST. LAWRENCE, CONTINUED—The Administration has asked the Federal Power Commission to turn down the license application of the Power Authority of the State of New York for power development of the St. Lawrence River. The newest plea for federal—as opposed to state—development of the St. Lawrence was one factor in recent hearings (oral) before the Federal Power Commission, conducted by Mon C. Wallgren, new chairman. In a letter to the commission, Secretary of Commerce Sawyer asked the commission to concur in the findings of Presiding Examiner Glen R. Law, who last December proposed that the New York application be turned down and the federal work be recommended to Congress.

SCHEDULE NOTE—With the Korean emergency on, Washington looks for Congress to recess—not adjourn—when the time comes. That way, Congressional leaders (and not the President) can decide whether and when Congress comes back, if things get hotter.

TAX TURNS—It looks now as if there'll be a tax law this year, after all. Of course, action in the House is all that's happened so far (after several twistings and turnings by committees and subcommittees of both houses) but observers say that the bill finally tacked together is shrewdly designed to please everybody—except big corporations. The House balanced its excise tax cuts by: Corporate rate rises, which should bring in $285 million more next year; dividend withholding, which is expected to uncover up to $1 billion of taxable income now escaping; tax on insurance companies (a non-recurring item) which would make the insurance people cough up something like $166 million on income earned since 1947; and plugging up miscellaneous loopholes.

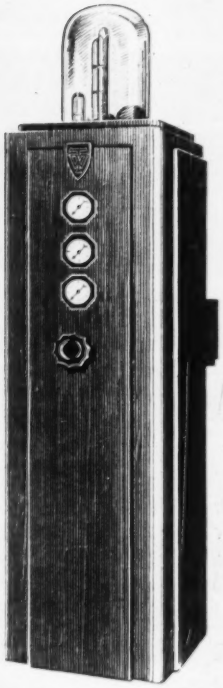
CEMENT SQUEEZE—Cement supplies are tightening in Chicago, with the biggest squeeze expected in August. Some companies already are beginning to draw on stocks to meet demand. Chicago's building boom, delayed by bad spring weather, is approaching its peak. So is highway and other heavy construction in that area. These three factors, plus production losses during the coal strike last spring, may make the cement shortage worse than the one we experienced back in 1948.

HOW UNLUCKY CAN YOU GET?—Dallas, Texas, homebuilders probably wonder what they have to do to make their point. Some months back, in an attempt to head off public housing they opposed, the homebuilders won from city council a pledge not to authorize any public housing if they'd erect at least 1,000 homes for Negroes within a year. Thus far, private builders have 1,823 units under construction, another 1,800 planned. But because there's been a wave of bombings of homes bought by Negroes in predominantly white South Dallas, council has asked the Dallas Housing Authority to build 1,000 public housing units for Negroes. It also urged private homebuilders to continue all the building they can for Negroes.

NEW EXPORT—The Air Force is shipping 2,500 construction troops of its engineer battalions to England to put three airbases into shape for U. S. bomber crew training use. Britain's Air Ministry sold the move to British labor as one necessary to avoid diversion of English labor from essential work. The job involves buildings, primarily—housing, hospitals, etc., to bring the bases to USAF standards. There'll be some lengthening and strengthening of runways, too. Each nation will pay for the work it does. British will requisition some land, relocate certain roads, etc. American troops will do all the work on the fields themselves.

WALLACE & TIERNAN CHLORINATORS *are*

Standouts in any Plan



AN OIL REFINERY IN TEXAS needs cooling water chlorination.

A PAPER MILL IN WISCONSIN requires white water slime control.

A SWIMMING POOL IN CALIFORNIA wants chlorination to guard against water-borne disease.

A SEWAGE PLANT IN INDIANA needs chlorination for disinfection.

A CAMP IN VERMONT wants to sterilize its well supply.

A POWER STATION IN FLORIDA asks for chlorination to improve heat transfer in condensers.

Whenever and wherever the plans call for chlorination. Wallace & Tiernan Equipment stands out as the first choice of engineers and architects all over the country.

The reasons for this preference aren't hard to find because smart buyers know that with Wallace & Tiernan Equipment they get:

WIDE SELECTION—Wallace & Tiernan Chlorinators and Hypochlorinators come in a variety of models and sizes handling from ounces up to 3 tons of chlorine daily.

PROVEN EQUIPMENT—Manufactured in a modern, precision-conscious plant, every piece of Wallace & Tiernan equipment is thoroughly tested (before leaving the factory) for the actual job conditions under which it will operate.

EXPERT DESIGN—All Wallace & Tiernan equipment is the product of expert development by a top notch research group specializing in chlorine and chemical control equipment. This is the same group that has pioneered such famous developments as the Visible Vacuum Principle, Break-Point Chlorination, and Residual Recording during the last 35 years.

SERVICE—Wallace & Tiernan's nationwide service organization is ready to solve bacteria-induced water treatment problems, whatever they may be.

Call your nearest Wallace & Tiernan Representative for your next job involving chlorination. He will be glad to help you.

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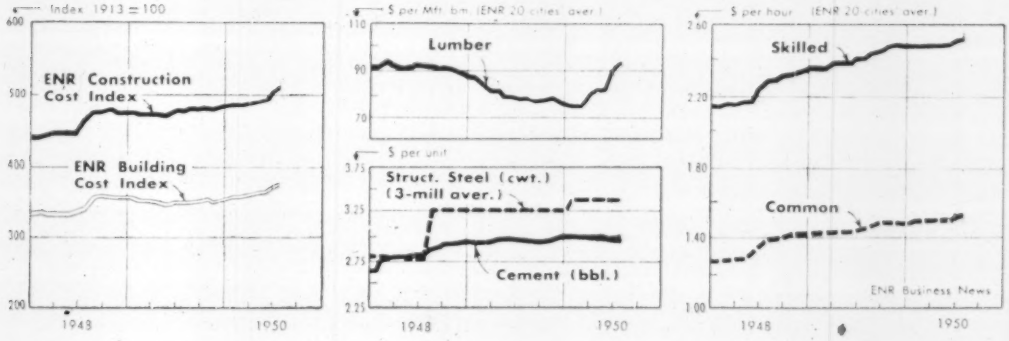
5-60

JULY CONSTRUCTION BUSINESS REPORT



ENR INDEXES (1913 = 100)	July '50	June '50	% Change	July '49	% Change
Construction Cost	511.91	506.45	+1.2	477.46	+7.2
Building Cost	376.90	372.96	+1.1	349.39	+7.8
MATERIAL PRICES (20-cities' average)					
Cement, bulk, per bbl	2.966	2.965	0.0	2.957	+0.3
Structural Steel, 3-mill aver., per cwt.	3.400	3.400	0.0	3.250	+4.6
Sand, per ton	1.970	1.968	+0.1	1.978	−0.4
Lumber, 2x4 Fir, per M ft. bm.	102.015	98.971	+3.1	85.073	+19.9
Lumber, 2x4 Pine, M ft. bm.	85.600	82.433	+3.8	73.446	+16.5
Common brick, per M	28.525	28.250	+0.9	27.662	+3.1
Ready-mixed concrete, per c. y.	10.265	10.333	−0.6	10.207	+0.5
Structural Clay Tile, 3x12x12 per M	133.900	132.900	+0.7	132.976	+0.6
WAGE RATES (20-cities' average)					
Common	1.538	1.528	+0.6	1.465	+4.9
Skilled (aver. 3 trades)	2.524	2.517	+0.2	2.413	+4.6
Bricklayers	2.803	2.783	+0.7	2.633	+6.4
Structural Ironworkers	2.478	2.478	0.0	2.382	+4.0
Carpenters'	2.292	2.289	+0.1	2.224	+3.0

CONTRACTS AWARDED (thous.)	June 1950	June 1949	% Change	Six Months 1950	Six Months 1949	% Change
Total U. S. (ENR reported)	$1,253,720	$896,128	+39.9	$5,665,066	$3,939,969	+43.7
Private	728,964	436,740	+66.7	3,254,378	1,892,496	+70.9
Public	525,656	459,388	+14.4	2,430,688	2,047,473	+18.7
Federal	165,933	121,150	−12.5	715,813	555,093	+28.9
ENR Constr. Volume Index, '13 = 100	427	326	+30.9	380	275	+38.1
NEW CONSTRUCTION CAPITAL						
Total	699,679	464,786	+50.5	2,592,269	2,672,198	−2.9
State & Municipal Bond Sales	322,462	275,441	+17.0	1,463,776	1,395,156	+4.9
Corporate Security Sales	377,217	189,345	+99.2	1,128,493	1,277,042	−11.6
Federal, non-federal work	.....	.....	.....	.....	.....	.....
Federal, federal work	.....	.....	.....	.....	.....	.....

MATERIAL SHIPMENTS & LABOR SUPPLY	May (M) April (A) 1950	May (M) April (A) 1949	% Change	Five Months (5) Four Months (4) 1950	Five Months (5) Four Months (4) 1949	% Change
Cement, thous. bbls., Bu. of Mines	18,475 A	17,779 A	+3.3	52,356 4	50,208 4	+4.2
Fabr. Struc. Steel, thous. tons, AISC	157 M	171 M	−8.1	740 5	835 5	−11.3
Lumber, mil. ft. bm., NLMA	3,219 A	2,620 A	+22.8	12,060 4	9,279 4	+29.9
Lumber Prod., mil. ft. bm., NLMA	3,227 A	2,604 A	+23.9	11,168 4	9,541 4	+17.0
Contract Const. Employ., thous. BLS	2,243 M	2,137 M	+4.9	(Av.) 1,992 5	(Av.) 2,012 5	−0.9

Remember!

...the *Special* Sluice Gate you need may be a CHAPMAN *Standard*

Better check with Chapman before you order *special sluice gates.* Frequently, you'll find the gate you require is already a Chapman standard — and available at a standard price.

You'll save, too, in the easier installation of Chapman Sluice Gates — interchangeable stems and couplings require no match-marking. What's more, Chapman Gates are obtainable with any type of operating control — manual, hydraulic cylinder or motor unit. For more complete information, send for a copy of the Chapman Sluice Gate Handbook.

The Chapman Valve Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS

Basis for a Water Policy

No mere touching up here and there is going to fit present federal water development practices into a sound national water policy. That is painfully evident throughout the report that the special committee of Engineers Joint Council—an organization of the five national engineering societies—has made to the President's temporary Water Resources Policy Commission in response to its request for help and suggestions.

In strong, candid language the committee spells out its opinion of what is wrong with current practices and trends. With equal definiteness it recommends what should be basic facets of a policy that would channel water resource development into a pattern that would produce the greatest benefits to the country as a whole.

This two-fisted approach is refreshing, although some of the objectivity expected of engineering reports is lost. In this connection several of the task committee reports contain recommendations that have been made repeatedly by groups distinctly and sometimes selfishly at loggerheads with various federal agencies. To that degree the report leaves itself open to attack by the federal empire builders on the ground that its high purpose is tinged with politics.

The report must be conceded, however, to represent the attitude and the opinions of the nation's engineering profession outside the federal service. Although the 80 members of the committee are outstanding specialists on water use and development, none is in the federal employ and thus representative of the viewpoint favoring centralization of authority and planning in Washington. On the other hand at least 25 of the committee members have had previous experience in the federal service and thus are peculiarly aware of those aspects of water development that are haphazard and uneconomic, which is indeed also the case with many conscientious public servants.

What should be the elements of a sound water policy? They are many and varied, as the committee points out, but a few basic ones illuminate the general pattern suggested—and emphasize a clash with many current practices.

According to the report a national water policy should require that project evaluations be made on the basis of clearly stated and logically derived estimates of benefits and costs, devoid of political expediency and exaggeration; that development, wherever feasible, be by local enterprise—governmental or private; that immediate beneficiaries should shoulder a fair share of the costs; and that all details of subsidies, for whatever purpose, including social change, should be clearly stated and regularly reported on.

Extension of these fundamentals to such water uses as navigation, irrigation and hydro power results in these definite committee recommendations: The use of inland waterways to force reductions in rates of competing land transportation should be abandoned. Justification of irrigation projects should be based solely on the relationship between costs to be incurred and tangible values actually to be created. And local enterprise should not merely be encouraged, but should have priority to develop hydro power under proper governmental control and regulation. All these are potent reminders of practices that have grown up without definite sanction or careful analysis from a public interest viewpoint.

To implement a uniform water policy and to alleviate and control competition between federal agencies, a board of impartial analysis and appraisal should be set up. In this recommendation the EJC committee parallels one made by the Hoover Commission, and also in editorials in these pages earlier than that.

In rendering a report in such a short time—less than six months—the committee members have performed an outstanding public service at considerable personal sacrifice. In making it so clear and unequivocal they have given the President's Water Resources Policy Commission a working paper of great value. It is to be hoped that the report will receive the considerate and careful attention and study that it rightly deserves.

Training Highway Engineers

Ohio has undertaken to meet the shortage of highway engineers by a stepped up training program (ENR May 11, p. 33). Key elements are starting salary of $264 a month for new graduates and a promised increase to $345 when the trainee gets his professional license. This is a much better starting rate than was offered to beginners in the past, plus reasonable assurance of a substantial raise.

As is common to most such training programs, the trainees are to be assigned to work in all major divisions of the highway department. The desirability of doing that cannot be too strongly emphasized. Under the plan as now set up in Ohio, however, there will be a new challenge to the division heads to provide jobs with enough responsibility to meet license requirements. A corollary benefit will be that trainees, pushed into a job with considerable responsibility, will be placed in a sink or swim position, which is one of the best ways to bring out a young man's capabilities quickly.

Engineering News-Record is a consolidation of Engineering News and Engineering Record, effected in 1917. The Contractor was consolidated with Engineering News-Record in 1918. Engineering News was founded in 1874 as The Engineer and Surveyor, which title subsequently became The Engineer, Architect and Surveyor. Engineering News and American Railway Journal and finally Engineering News. Engineering Record was established in 1877 as the Plumber and Sanitary Engineer. Subsequently it became The Sanitary Engineer, Engineering and Building Record, and, finally, Engineering Record. All rights to the above titles are reserved.

Ten Years Ago...

A Decade of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

in August, 1939, this concrete test paving was laid in Second Avenue North, Minneapolis. The badly scaled section of roadway in the background was made with regular portland cement. The foreground section, *laid at the same time*, was made with Atlas Duraplastic — the first commercial use of the air-entraining portland cement originated and developed by Universal Atlas.

Both sections, subjected to the severity of ten Minneapolis winters and to heavy applications of de-icing salts, are shown just as they appeared in July, 1949—convincing proof of the characteristic durability of Duraplastic concrete, of its high resistance to freezing-thawing weather and the scaling action of de-icing salts. Longitudinal structural crack shows some ravelling. Note perfect transverse joint.

Today... It's DURAPLASTIC* for more durable structures

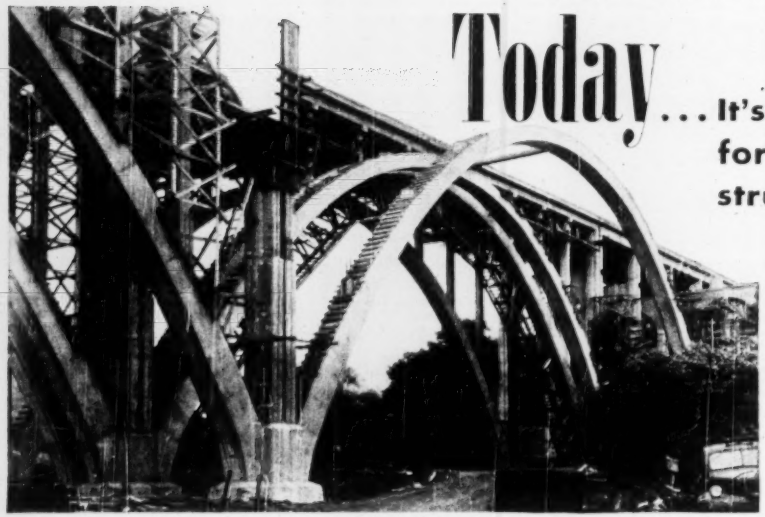


Photo taken during construction of three-span bridge on Penn-Lincoln Highway. Spans for bridge and paving and underpasses made with Atlas Duraplastic. Designed by Pennsylvania Dept. of Highways. Contractor: Dinardo, Inc., Pittsburgh, Pa.

From the first paving-test installation to this tremendous three-span bridge, Atlas Duraplastic air-entraining portland cement has demonstrated both its added durability in countless paving jobs and its improved appearance in structural uses.

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For structural concrete needs of today and tomorrow, Duraplastic offers *better concrete at no extra cost*. It provides the precise amount of air-entraining agent interground with the cement for satisfactory field performance. It complies with ASTM and Federal Specifications, sells at the same price as regular cement and calls for no unusual changes in procedure. For further information write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

* * *

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ENR 0-47

ATLAS DURAPLASTIC

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ENGINEERING NEWS-RECORD

JULY 6, 1950 VOL. 145 NO. 1

EJC scores U.S. water policy inequities

Engineers Joint Council report is critical, recommends changes

United States water development policy would be thoroughly revised if recommendations made by the Engineers Joint Council this week were followed.

These recommendations came in a searching report by EJC's Water Policy Panel. The report went this week to President Truman's Water Resources Policy Commission, established last winter. (ENR Jan. 12, p. 24). EJC is one of more than 150 groups—educational, trade and professional—asked to submit its recommendations.

There was sharp criticism of existing federal policy—or the lack of it—throughout the EJC document. And it was studded with recommendations which have been made through the years by various groups from outright lobbies to the Hoover Commission.

EJC's panel of more than 80 "experts" contained no direct federal representation, as a matter of policy. However, about one-third of its membership has had experience working directly with and for federal water development agencies.

• **No one's to blame**—Despite the blunt nature of many of its findings and proposals, EJC's report was careful not to blame any agency or group for the existing "chaotic situation in which the country now finds itself." EJC noted that both political parties "respond almost unanimously to pressure and trading" involved in federal water development legislation.

Considering the deeply controversial nature of many of the topics examined and recommendations made, the panel's Coordinating Committee spoke with reserve when it said, of its Task Force reports, that:

"Naturally, not all members of each committee subscribe to all points and comments in committee statements. It is highly gratifying, however, to record that no single committee submitted a report in which major principles were not concurred in by all of the signatories."

General recommendations by the

(Continued on page 26)

EJC's policies governing water study

These are summaries of the policies generally applicable to federal water resource development which were established for guidance of the EJC Task committees surveying various water development fields.

General Policy—That policy which is generally applicable should be prescribed for all federal water resource development and for all agencies performing it.

Financing—It should be as local in character—whether public or private—as may be feasible.

Study and Planning—Today's rate of federal project planning and authorizing is excessive and unsound. Time enough must be taken to get the facts and determine the need. Spending should be lower in prosperity, higher in slumps.

Benefits—These should be expressed in an average annual dollar yield. They must exceed—by function—the alternative cost of that function. Alternative cost should be figured by individual functions.

Subsidy—Those who receive the benefits should pay for them—to the greatest extent feasible. Where subsidy exists, it should be disclosed completely, from first reports to annual operating statements.

Costs—These should be accounted for thoroughly. Estimates must be realistic. All interest cost should be included.

Taxes—Water development costs should include all tax equivalents. Tax payments should continue on lands acquired for these projects. Federal revenue-producing projects should be required to pay state and federal income and excise taxes or their equivalents.

Cost Allocation—Distribution of costs in proportion to benefits is improper. Allocations of capital costs among joint facilities should be made by the Proportionate-Use-of-Capacity Method.

Justification—No project should be undertaken which is not economically feasible. All functions should be justified by all agencies on the basis of established standards. Reappraisals should be made from time to time—by functions in multi-purpose projects.

Benefit-to-Cost Ratios—These ratios should be not less than 1 to 1, favoring tangible benefits in computations made as recommended by the committee. Where factors can't be estimated closely or benefits are long delayed, the ratio should be not less than 2 to 1.

Project vs Basin Justification—Individual projects should be subject to standard criteria of justification in all cases except where two or more are physically and of absolute necessity interdependent.

Authorization—This should come solely from Congress—by individual projects. Approval should not be in blanket form; should constitute an absolute limit on appropriations; should be Congressionally reviewed with each substantial change in the project; and should become void if costs exceed authorization estimates by 20%. No new projects should be authorized until a national policy has been adopted.

Operation and Amortization Expense—Federal projects should be self-supporting and, as far as practical, self-liquidating. Amortization should be on a straight-line basis in not more than 50 years. All project income should go into the Treasury—for disbursement only by appropriation. Accounting should be uniform for all functions.

Priorities—Except as to uses affecting interstate commerce, determination of water-use priorities should not be primarily a federal function. Not all existing interstate uses are beyond question. In not all land utilization cases should water development uses get priority. Groundwater resources need full consideration.

Impartial Analysis—A board to review and analyze projects impartially should be created. Its reviews and reports should be a prerequisite to Congressional authorization or appropriation.

EJC scores U.S. water policy

(Continued from page 25)

Coordinating Committee were substantially these:

Water development is a national interest, not necessarily a federal one. What can be done locally should be so performed. Federal performance should be confined to what's necessary and what requires action by all the people. And such collective action is justified only for the following purposes:

1. National defense—or for substantial benefit to all citizens.

2. As an aid to financing works of benefit to a few on terms equitable to all.

• No punches pulled—Many of the specific policies which the Coordinating Committee held generally applicable to all federal water development fly directly in the face of existing practice—existing law or existing tradition. As such, much of the report is bound to be unacceptable to many federal agencies.

Considering the background of some members of the Water Resources Policy Commission—and the fact that its staff is recruited from federal agencies responsible for water development—EJC's report is bound to hit with a thump on those who solicited and will evaluate it.

For instance EJC reiterates throughout that whatever can be done locally be so performed. Just as one example, that's directly opposite to the history of California's Central Valley project, one of the most tremendous of all water development programs. That program began under state auspices. It became a federal undertaking about 15 years ago and has grown more vast since that time.

Also, EJC wants a dollar sign tied to every benefit considered in the justification of a project. Actually, the trend in Washington is an opposite one. As cheap projects are built, only those more expensive remain.

To justify under existing requirements these more expensive projects, more and more benefits must be found. (One device is the Reclamation Bureau's "basin account," a device which EJC flatly and specifically spurns.)

It is easy enough to put a dollar value on a project's hydroelectric energy output. It is a little harder to tie a dollar sign on crop yields.

• Taxes should be paid—EJC wants to charge to federal water developments those taxes such a project would face were it in private hands. This is an issue that has been fought violently between protagonists of public and private power ownership—without any visible success on the part of those who would tax federal power. Even the tax-equivalent payments called for by the Tennessee Valley Authority Act are confined to that act—and these are far less extensive than those called for by EJC.

EJC suggests that projects should have to meet at least a 4 to 3 benefits-to-cost ratio—in some cases, a 2 to 1 ratio. Numerous projects are authorized today which barely exceed the traditional 1 to 1 ratio, with intangibles included in achieving the 1 to 1 level. But EJC wants no intangibles in arriving at the ratios it proposes.

There are numerous other points of direct conflict between EJC's recommendations and existing practice. Thus, there are numerous other opportunities for conflict between agencies with a vested interest in existing practice (and non-federal groups such as EJC, its constituent societies—and even the employers of various members of EJC's Water Panel, its committees and its Task Forces.

Delicate as it may be, federal agencies are bound to comment—privately if not publicly—on some of EJC's survey personnel. Part of this comment will arise from EJC's decision not to include federal engineers on its panel or working committees.

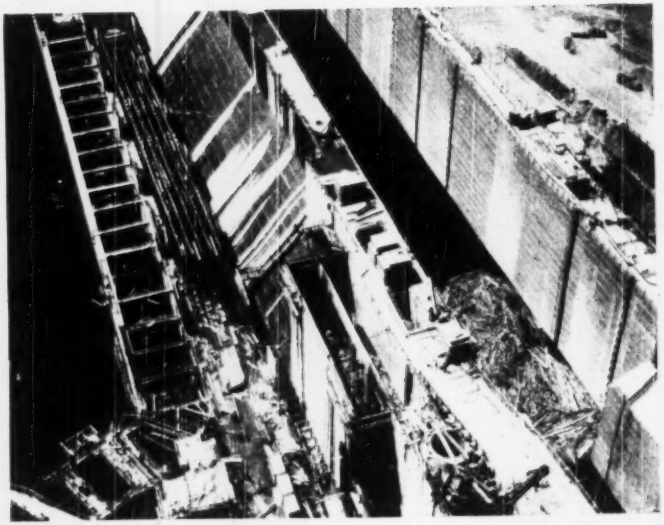
Part of it will arise from the fact that the EJC group includes a few engineers who are employed by organizations that often oppose the federal agencies involved and their projects. This opposition extends from direct competition to appearances before legislative groups in opposition to federal development plans.

But it would be unfair to ascribe the recommendations in the report entirely to those with backgrounds of opposition to federal water practices. Numerous members of the committees have had considerable experience on the federal side, even in some cases to the point of aiding in the establishment of some of the practices now criticized.

• Horner heads panel—W. W. Horner, St. Louis consulting engineer and a past president of the American Society of Civil Engineers, is chairman of EJC's panel. Other members include E. L. Clark, of the American Institute of Mining and Metallurgical Engineers; R. D. Hoak, of the American Institute of Chemical Engineers; C. W. Mavott, of the American Institute of Electrical Engineers; and W. F. Uhl, of the American Society of Mechanical Engineers.

EJC's Coordinating Committee was headed by Abel Wolman, and included as members B. A. Bakhmeteff, E. H. Enslow, Julian Hinds, M. M. Leighton, E. E. Moreland, Thorndike Saville, and, until last April 15, E. A. Shoup.

For Task Committee findings, see the following page.



POLICY NEEDED—McNary Dam, on the Columbia River between Washington and Oregon, is a good example of the type of federal water development over which a policy dispute is going on. It's built to render navigation service, generate power. Shown here is its fish ladder beside the navigation lock. (Corps of Engineers Photo)

Task Committee reports on water use

Here are summarized the recommendations of five Task Committees which helped prepare FJC's report on national water policy.

WATER SUPPLY

Domestic and industrial water use is the paramount one. This, also, is the only universally distributed use—unlike such more local uses as irrigation and power development. Despite this national character of domestic and industrial use, supplying water for this purpose is essentially a local undertaking.

This being so, urban or private industrial water supply should be built and paid for by those using it. At 2¢ per person per day, it's not an intolerable local cost.

Also, domestic and industrial water being so vital, pollution must be so controlled as to make it practical to provide quality as well as quantity. Pollution should be regulated as nearly locally as possible. Federal jurisdiction of pollution control should be confined to administration of existing laws, research and guidance for non-federal regulation.

Communities should pay their fair share of dual- or multi-purpose projects involving public water supply.

FLOOD CONTROL

Flood control, vital to both federal and local interests, should be effected cooperatively, not solely by federal interests. These projects should have public, independent review. Beneficiaries should make equitable reimbursement to the federal government, and hidden subsidies should not be countenanced. A basin's flood control projects should not be postponed pending completion of upstream flow retardation projects.

Federal leadership in map making and data accumulation is necessary. And federal contributions to project costs should not exceed federal benefits. The United States may properly lend construction funds to local agencies or build a project entirely on a prepaid reimbursable basis. And no flood control undertaking should be feasible unless it meets these standards:

1. Average annual tangible benefits must exceed average annual costs.

2. Such benefits, plus whatever the beneficiaries of intangible benefits are willing to pay for those intangibles, must be materially greater than average annual costs.

3. Local interests must contribute an equitable share of intangible benefit costs.

In judging feasibility of components of a multi-purpose project, incremental costs, rather than single purpose costs of that component, are justified.

A federal revolving fund to assist local financing by loans should be set up. Loans should be preceded by firm repayment schedules which should not exceed 50 years or the maximum estimated project life. Project maintenance responsibility should lie with the most interested party.

NAVIGATION

The federal government had spent, as of a year ago, about $5.7 billion on river and harbor navigation work. Adding related non-federal investment probably would bring the figure to well over 10.2 billion. Maintenance costs have doubled in 11 years to about $85,500,000 yearly and are being augmented all the time by new navigation construction. Some projects are in existence which have no justification.

Annual publication should be made of comparative figures for costs, traffic and benefits—both as estimated on authorization and as actually realized. A method should be set up for terminating uneconomical projects. No new artificial, toll-free canals should be built and study should be made of levying tolls on users of other types of navigation works. And the report adds:

"The use of inland waterways as a regulatory agency to force reductions in rates on land carriers should be abandoned."

IRRIGATION

Irrigated land now totals about 22,000,000 acres. About 50,000,000 more are susceptible of it—with sufficient water for all of them. About 13,000,000 acres are under development or study for reclamation and 8,000,000 more for supplemental water. Costs of irrigation are increasing and will continue to do so in the future.

There must be developed and followed rational justification standards. They should exclude intangibles. Costs should be borne directly in proportion to benefits received. If this principle be not followed—and increasingly it is not now being followed—water development will "degenerate into the diversion of national income for the benefit of particular regions or classes of people for political expediency."

The report criticizes the fact that as irrigation cost repayments have been extended from 10 to 40 or more, the no-interest policy has been continued. This increases the hidden irrigation subsidy to a point that is "far greater than is commonly realized." It would be better to estimate what water users can pay, credit this amount as amortization and interest and then determine what balance must be repaid from power and other sources within the project's useful life.

HYDRO POWER

Capital costs of federal power should not be subsidized. No power should be sold at less than true cost.

Costs should include all taxes that would be payable on the lands, improvements and business if privately owned. Local enterprise should have priority on hydroelectric power development except where specifically reserved by Congress.

Federally generated power should be sold at the prime plant. Aside from federal energy requirements, there should be federal transmission only to obtain a higher price for the power, and then only after thorough cost allocation on the transmission facilities.

Federal power authorizations should be predicated on the sale they turn in to the Treasury. States and local agencies should be allowed to acquire federal power facilities.

National defense or "strengthening of the national economy" per se should not be adequate justification for federal power development.

And federal power should not be used as a yardstick to determine private power rates and costs.

BIG LIFT—This 150-ton capacity floating derrick has been purchased by the Johnson Western Co., of Coronado and San Pedro, Cal., from the U. S. Navy. Here it's shown lifting the 140-ton cab of the derrick barge Coronado. Watertight compartments will be flooded as the derrick assumes the full load to maintain trim.

Revise reinforcing bar specifications, discuss soil properties at ASTM

Testing materials group elects Forest Products Laboratory chief as president—Concentrates on improving existing standards

E. S. Merritt
Associate Editor

Concentrating their efforts in general on improving existing specifications rather than on new standards, members of the American Society for Testing Materials closed a four-day meeting at Atlantic City, N. J., June 30.

The group elected E. J. Markwardt, assistant director of the U. S. Forest Products Laboratory, president (see cover picture and p. 14) and F. S. Fuller, engineer in charge of works laboratory, General Electric Co., vice president.

• **Revision**—One exception to the general trend toward improvement of existing specifications was a revision of "Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement" (A305-49).

Adopted last year, this specification led to an increase in allowable bond stresses for bars meeting its requirements. As a consequence, steel companies have been converting from the old type deformed bars to new patterns, including a change from 1/8 and 1/4 in. squares to rounds having equivalent sections.

Because of the odd size diameter of these three bars, Subcommittee V on steel reinforcing bars recommended to Committee A-1 on steel that bars be designated by numbers.

Thus, in the revision of A 305, the number given to each bar is the number of eighths of an inch included in its nominal diameter. A bar weighing 0.376 lb per ft, having a nominal diameter of 1.410 in. (minus 1/4 in. square) now becomes a No. 11.

Because of these changes in deformations and in designations, standard specifications for billet steel bars for concrete reinforcement (A15), rail steel bars (A16), and axle steel bars (A160) are also being revised. The subcommittee recommended that requirements, governing properties of new type bars replace those for the old types.

• **Metals and soils**—Ninety papers presented in the technical sessions dealt principally with metals and soils. As to metals, properties studied were corrosion and erosion of gas turbine materials, creep and effect of temperature; symposiums were held on methods of testing quality control, appearance, and chemical analysis.

In the sessions on soils, triaxial load testing and consolidation and classification were the principal themes. Donald M. Burmister, of Columbia University, cautioned at the session that the main purpose of the triaxial compression test is to provide basic information on the stress-strain characteristics of soils. "The actual behavior of soils," he said, "is not only determined by its potential behavior characteristics, but also by the stresses imposed by natural environment and by construction techniques. Testing techniques must take actual conditions into account."

Stanley J. Johnson, of the Corps of Engineers Waterways Experiment Station, told of three types of tests used by his organization for shear testing. Unconsolidated-undrained, consolidated-undrained and consolidated-drained. The first two types are performed, Mr. Johnson said, for practical problems in the triaxial compression apparatus; the third (a slow procedure) is conducted in a shear apparatus.

H. L. Worley, of the Kansas State Highway Commission, reported that triaxial tests have been used in his state to design 1,000 miles of flexible pavement. Modulii of deformation obtained from undisturbed soil samples serve as design criteria—rather than ultimate strengths.

R. K. Bernhard and D. Berdan, of Rutgers University, reported on pilot studies of soil density measurements by X-ray. Both felt that the studies might lead to practical applications of X-rays or radioactive materials, especially where undisturbed samples cannot be obtained otherwise. The two visualized two steel pipes sunk into the ground—one containing a radioactive isotope, the other an electrometer tube and ionization chamber, connected to an indicator on the surface. Such a setup should make it possible to determine changes in density in the soil between the two pipes.

• **Soil identification needed**—Three speakers urged the necessity of identification and classification of soils. Prof. Bumister and Earl J. Felt, manager of the transport development section of the Portland Cement Association, suggested that soils should be identified in terms of composition and character of the granular components (gravel, sand, silt) and the proportions, plasticity and clay qualities of the clay component. Mr. Felt stressed the point that the soil unit to be considered in the field is the complete soil profile, not individual soil materials or soil layers.

F. A. Mohn Nur, of the U. S. Bureau of Reclamation, outlined the Bureau's system of classification based on Casagrande's Airfield Classification; and W. F. Abercrombie, of the Georgia State Highway Department, described the system for subgrade materials initiated by the Highway Research Board.

• **Other activity**—Among the steps being taken by ASTM committees to keep specifications up to date is the effort of the Additions Subcommittee of Committee C-1 on Cement to prepare a standard for additions used in making air-entraining portland cements (C226-50T). The object is to eliminate need for the committee to pass on acceptability of individual air-entraining additions.

The Charles B. Dudley Medal for outstanding research papers was presented to Prof. J. Lizzi, Syracuse University; Prof. D. S. Clark and Prof. D. S. Wood won the Richard L. Templin Award for a paper on a new testing method; O. B. Ellis, Armco Steel Corp., received the Sam Tour award for research on corrosion testing.

N.Y.C. builders, unions sign 3-year wage pact

Marking another period of labor peace in New York City construction, 24 building trades unions signed a 3-year pact with employers June 30.

Six other unions, including bricklayers, electricians and plumbers, had signed previously with the New York Building Trades Employers Assn.

The 24 unions which signed June 30 agreed that there would be no interruption of work during the next three years, most of them on the basis of wage rates that rise about 25 cents hourly, with no changes in hours. The agreement is based on a combination of the Bureau of Labor Statistics cost of living index and a provision that, should the index rise more than 10%, adjustments will be made. The new agreement was signed exactly as the city's first signed Jan. 1, 1845, expired.

Of the 30 agreement of which the compact is composed, only the bricklayers, electricians and plumbers varied from the thirty-year pattern. The plumbers signed for five years, the bricklayers two years and the electricians one year. The bricklayers incidentally, obtained the first pension settlement for any construction trade in the country. They accepted their old rate of $2.20 hourly, but with a 5% employer contribution to benefit for pension purposes.

CONSTRUCTION BUSINESS

June volume hits an all-time high; record first half is 44% over 1949

Contract awards in June totaling $1,255,720,000 set a new record for any month in history—peace or war. Housing projects, highways and bridges all hit new highs in June.

This highest crest yet in volume closes out the greatest first half in construction history. The January-June total of $5,665,066,000 in engineering construction contracts is 44% over 1949, 70% over 1948 and 15% over 1942, the previous record first half of contract awards.

June was the biggest month ever for private construction at $728,064,000 and the biggest peacetime month for public works contracts, $525,656,000.

Even more private housing projects were contracted in June than in earlier record months of this year. The $464,068,000 worth of June projects is 35% over the April housing record.

Highway contracts also hit a new high at $153,331,000—33% over the record totals of $115 million in July of both 1949 and 1948. And, going along with highways, bridge contracts valued at $51,309,000 set a new record —21% over last September, the previous high month.

• **Record first half**—Here is how the record first half of 1950 compares with last year:

Private contracts totaling $3,234,378,000 are 71% ahead of last year. Public works, $2,430,688,000, are up 19%. Federal contracts totaling $715,813,000 are 29% over last year; state and municipal contracts at $1,714,875,000 are up 15%.

Biggest boom to 1950 construction is housing. Large-scale housing projects contracts are more than double last year (up 114%). This is a main driving force sending waterworks and commercial building also to new highs, and keeping sewerage contracts at last year's record rate.

Other types of construction going higher than ever before are streets and roads, bridges, industrial buildings.

Volume outlook good but competition fierce—AGC

A survey last week of Associated General Contractor chapters shows the national construction situation and outlook to be: 112 chapters representing 5,500 firms:

• **Current volume**—80% reported good to excellent, 7% mostly highway chapters, reported volume poor, 4% reported fair.

• **Outlook rest of 1950**—85% reported good to excellent, 8% all highway, reported poor, 7% reported fair.

• **Competition**—97% reported strong, very strong, fierce, worse, etc. 3% reported slightly decreasing or normal.

• **Costs**—58% reported labor and materials prices up somewhat, 30% reported costs stabilized, 12% all highway, reported costs down. Many reported bids down with prices up.

• **Labor**—59% reported no shortages, 41% reported shortages. Of shortages, 63% reported in trowel trades.

• **Materials**—53% reported shortages in materials, the balance, adequate. Principal shortages reported: steel, 25%; cement, 23%; lumber, 19%; brick, 8%; gypsum, 4.

• **Building**—Breakdowns of the replies from building contractors or building chapters are:

Current volume—good to excellent, 64%; fair to poor, 6%.

Balance of 1950—good to excellent, 90%; fair to poor, 10%.

Competition—strong, 96%; normal, 4%.

Costs—up, 74%; stabilized, 23%; down, 3%.

Materials—shortages, 59%.

Labor—shortages, 48%.

• **Highway**—Breakdowns of the replies from highway contractors or highway chapters are:

Current volume—good to excellent, 75%; fair to poor, 25%.

Balance of 1950—good to excellent, 69%; fair to poor, 31%.

Competition—strong, 100%.

Costs—up, 27%; stabilized, 30%; down, 43%.

Materials—shortages, 47%.

Labor—shortages, 16%.

• **Heavy**—Breakdowns of the replies from heavy contractors or heavy chapters are:

Current volume—good to excellent, 90%; fair to poor, 10%.

Balance of 1950—good to excellent, 81%; fair to poor, 19%.

Competition—strong, 96%; normal, 4%.

Costs—up, 64%; stabilized, 32%.

Materials—shortages, 47%.

Labor—shortages, 36%.

ENGINEERING CONSTRUCTION CONTRACTS REPORTED TO ENGINEERING NEWS-RECORD—JUNE, 1950

Source of data: News-Record reports contracts of $U.S. Corps of Engineers, awarded after bids are opened. Waterways, harbor, irrigation, drainage and flood control projects $28,000; other public works $50,000; industrial buildings $250,000; commercial buildings $250,000.

Five Weeks—Thousands of Dollars (000 omitted)

	June, 1950							U.S. Cumulative Six Months		% Change	Canada June, 1950
	New England	Middle Atlantic	South	Mid-West	West of Mississippi	Far West	Total U.S.	1950	1949	'49-'50	
Public Works											
Waterways, harbors, canals, irrigation, drainage, flood control	1,376	5,102	4,199	2,108	6,629	3,263	22,737	118,467	87,154	+36	1,410
Sewerage	1,305	6,966	8,546	4,620	5,908	5,285	32,763	128,006	129,976	-1	1,087
Bridges	3,382	26,259	5,855	6,380	5,235	5,518	51,309	188,201	164,880	+14	4,014
Earthwork and waterways	680	3,846	6,661	807	11,260	14,009	69,943	236,282	208,638	+13	7,086
Streets and roads	2,812	42,420	30,926	19,503	33,849	18,741	153,331	617,746	496,863	+24	5,724
Public buildings (residential)	8,385	5,098	2,427	809	1,061	3,662	22,422	118,110	90,302	+31	2,394
Other (public buildings)	12,530	21,967	35,618	21,401	25,290	24,177	141,223	828,334	602,808	+37	8,420
Unclassified	5,156	10,058	5,863	5,939	7,392	8,521	40,928	195,542	141,962	+38	9,465
Total public	35,630	125,829	98,119	62,317	120,055	83,676	525,656	2,430,688	2,047,172	+19	39,609
Federal (construction included in above classifications)	2,196	7,614	14,856	7,883	13,653	29,711	105,933	715,813	555,093	+29	5,464
Private											
Dwellings			1,407				1,497	3,980	2,063	+93	
Factories, warehouses	1,511	21,054	13,992	27,774	28,752	5,867	99,290	529,187	564,290	+15	11,152
Office buildings, residential, commercial buildings	11,082	160,351	61,575	90,301	85,214	85,755	464,008	1,906,298	880,245	+116	7,224
Other nonresidential buildings	4,013	25,993	10,962	23,098	19,887	4,171	88,126	461,560	290,985	+59	6,030
Unclassified		50	2,965	11,050	60,302	806	75,183	282,853	208,841	+38	1,677
Total private	18,606	208,448	91,061	122,223	191,155	96,571	728,064	3,234,378	1,892,196	+71	26,193
Total Engineering Construction:											
June, 1950—5 weeks	54,236	334,277	189,219	184,540	311,210	180,247	1,253,720				65,802
May, 1950—4 weeks	50,176	277,331	110,557	140,315	186,067	140,865	931,153				48,519
June, 1949—5 weeks	51,461	182,323	127,820	143,484	236,766	151,809	896,128				47,861
Six Months—1950	285,421	1,460,208	825,222	776,106	1,304,314	1,013,795		5,665,066			249,295
Six Months—1949	175,787	986,418	588,580	516,816	1,035,737	617,011			3,920,963		240,042
% Change 49 to 50	+63	+48	+40	+50	+26	+59				+41	+04

BIDS AND BIDDERS

Major project news received after Construction Reports page 74 went to press.

Apartments—John W. Harris Associates, Chicago, Ill., are owners and contractors for eight 14 story apartments, known as Ivanhoe Gardens, in Chicago, to cost about $10,000,000. Shaw, Metz & Dolio, Chicago, are architects.

Bolivian Road—Morrison Pan Pacific Co., Paramount, Calif., will complete Cochabamba-Santa Cruz Highway in Bolivia for the Bolivian Government, La Paz. Estimated cost is about $16,000,000. Knappen-Tippetts-Abbett Engineering Co., New York, N. Y., is engineer.

Office—Charles H. Fisher, Detroit, Mich., plans 11 story office in Detroit at about $10,000,000. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect.

Gas Pipe Line—Bivins Gas Pipe Line Comm., Inc., Houston, Tex., plans constructing 1,275 miles 24 inch gas line from Texas, running through Louisiana, Arkansas, Missouri, Illinois, Indiana into southern Michigan. Including booster stations, cost will be about $132,650,000. An additional 462 mile line will extend from Texas to Louisiana and will cost $9,820,000. Plans for additional compressor stations and feeder lines, which these projects are completed are estimated at $32,500,000. R. G. Schneider is consulting engineer. Application for licensing project has been made to Federal Power Commission.

Trenton Dam—Arundel Corp., Inc., Ralph A. Bell and United Concrete Pipe Corp., Allambee, Calif., were low bidders for constructing Trenton Dam, Frenchman-Cambridge Division, Missouri River Projects in Nebraska at $4,726,577. Department of Reclamation, Denver, Colo., opened bids June 23; the estimated cost is $5,594,528.

Laboratories—International Harvester Co., Fort Wayne, Ind., awarded contract for the construction of motor truck engineering and testing laboratories at Fort Wayne, to Ragnar Benson, Inc., Chicago, Ill. Fabrication and erection of structural steel was let to Gage Structural Steel Co., Chicago, Ill. Total cost will be $6,500,000. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is engineer.

Fairgrounds—Third Second Agricultural District, Santa Ana, Calif., plans improving Orange County Fairgrounds at Santa Ana, to cost about $6,000,000. Bennett & Bennett, Pasadena, are architect for the fairgrounds project.

Houses—Modern Home Builders, Inc., Bellevue, Wash., plans to erect 5,500 houses near Bellevue during a twelve year period. Entire cost will be $30,000,000.

Classroom—University of Michigan, Ann Arbor, Mich., plans rebuilding Haven Hall to cost about $4,000,000. Legislature has voted $1,500,000 to begin work.

Hospital—St. Joseph Hospital, Burbank, Calif., plans hospital addition at Burbank. Estimated cost is $5,000,000. John W. Maloney, Seattle, Wash., is architect.

Dam—U. S. Engineers, Tullahoma, Tenn., awarded contract for dam in Elk River, near Tullahoma, for use in recording testing equipment at Arnold Engineering Development to Arundel Corp., Baltimore, Md., and L. E. Dixon Construction Co., San Gabriel, Calif., at $2,865,000.

Water Plant—City of Dallas, Tex., will open bids July 25 for chemical mixing basins, steel water storage units at Carrollton Water Plant. Cost will be about $2,000,000. Myers & Noyes, Dallas, are engineers.

Apartments—Ingalton Lattimore Gardens Homes, Chicago, Ill., plans seventeen apartments in Chicago at $4,000,000. Holabird, Holsman, Klump & Taylor, Chicago, are architects.

Chief Joseph Dam—U. S. Engineers, Seattle, Wash., awarded contract for constructing first stage of Chief Joseph Dams near Bridgeport, Wash., to Peter Kiewit Sons' Co., Tacoma, Wash., $2,252,344. Estimated cost is $2,500,000. Kiewit was also low on May 22 opening at $2,715,855, but Independent Pipe Line Co., Tacoma, protested Kiewit's bid as incomplete because of error [illegible]

Bridges—New Jersey Turnpike Commission, Trenton, N. J., received low bids June 26 for bridges in Burlington & Mercer Counties, from Cumberland Boulevard to Philadelphia, Pa., at $2,124,444, and for bridges in Union County from Gray Construction Co., New York, N. Y., at $2,275,751. Parsons, Brinckerhoff, Hall & MacDonald, New York, N. Y., are consulting engineers on the project and Edwards & Kelcey, Frederick R. Harris, Inc., O. F. Parker and Ammann & Whitney, Newark, N. J., are [illegible] engineers on [illegible]

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base	100	1913	1926
Construction Cost	July '50	511.91	246.67
Building Cost	July '50	376.56	263.74
Volume	June '50	427	187

Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

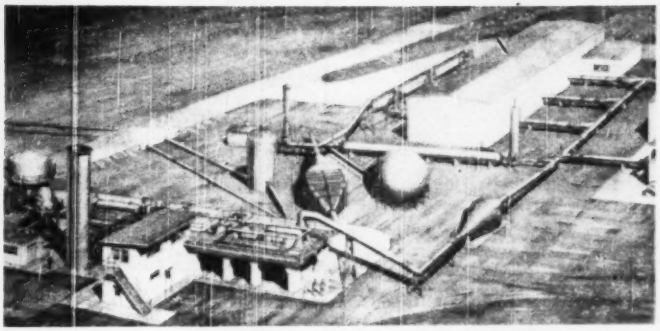
	Week of July 6 1950	1950 wks.)	1949 wks.)	% chge
Federal	$29.[illegible]	$[illegible]	$[illegible]	[illegible]
State & Mun.	[illegible]	[illegible]	[illegible]	[illegible]
Total Public	$[illegible]	$[illegible]	$[illegible]	[illegible]
Private	[illegible]	[illegible]	[illegible]	[illegible]
U. S. Total	$211,585,829	$[illegible]	$[illegible]	[illegible]

Contracts by type of work

	This Week	1950 wks.)	1949 wks.)	Cumulative % chge
Waterworks	$[illegible]	$[illegible]	$[illegible]	[illegible]
Sewerage	[illegible]	[illegible]	[illegible]	[illegible]
Bridges	[illegible]	[illegible]	[illegible]	[illegible]
Highways	[illegible]	[illegible]	[illegible]	[illegible]
Earthwork	[illegible]	[illegible]	[illegible]	[illegible]
Waterways	[illegible]	[illegible]	[illegible]	[illegible]
Buildings				
Public	[illegible]	[illegible]	[illegible]	[illegible]
Industrial	[illegible]	[illegible]	[illegible]	[illegible]
Commercial	[illegible]	[illegible]	[illegible]	[illegible]
Residential	[illegible]	[illegible]	[illegible]	[illegible]

NOTE: Minimum size projects included: sewer, waterworks and waterway projects, $25,000; other public works, $50,000; industrial buildings, $250,000; other buildings, $200,000.

Bond Election—City of Charlotte, N. C., will vote July 29 on $1,750,000 bonds to enlarge water supply; $2,000,000 for improving sewerage system and constructing new sewage plants; $1,500,000 for grade crossings and $500,000 for street improvements.



PUSHBUTTON PLACE—The Navy is spending $30,000,000 to develop its Air Missile Test Center, at Point Mugu, Calif. First phase is about complete. At top above is an artist's sketch of the air blast facility, contract for which has just been let. It's a form of wind tunnel, powered by a 25,000-hp plant. Its three nozzles will feed two supersonic and one transsonic test chambers. Below is shown the latest type of enlisted men's barracks, to accommodate 500 men. (Official U. S. Navy Photos)

Navy readies missile test center

With the award of an $821,225 contract to the Otteo Construction Co., Long Beach, Calif., for construction of an air blast facility, the first installment of a $30,000,000 permanent building program at the Naval Air Missile Test Center, Point Mugu, Calif., neared completion.

Started in 1948 following Congressional appropriation of $14,000,000, more than $9,500,000 worth of building and engineering projects have been completed or are under way. Only about $500,000 remains for other projects from the original appropriation. About $2,400,000 for land acquisition and $1,500,000 for collateral equipment, administration and soil conservation made up the balance.

Plans and specifications are now nearing completion for a new fuel tank farm, a sewage treatment plant and a boundary fence and perimeter road, to exhaust remaining funds.

• **More to come**—The second installment of construction, planned contingent upon the appropriation of another $16,000,000, will consist of 34 separate projects devoted mainly to missile launching and other technical facilities. Upon its completion, the center will be the most modern and complete missile testing station in the world, the Navy says.

The air blast facility, with 25,000 hp power plant, is a variation of wind tunnel that permits testing of engines under the supersonic conditions encountered by rockets and guided missiles. The Bureau of Aeronautics has allocated $1,332,000 for its erection. Air from the blower feeds a wind tunnel building containing three nozzle sections, of which two nozzles will be for supersonic tests and one for transsonic tests.

The first contract to be awarded under the project was for preconstruction surveys, engineering investigation and preparation of construction drawings and specifications. It was completed last April by the Parsons-Jurbjet Co. at a cost of $1,215,00

• **Dredging raised sites**—Before contracts could be advertised for new roads, utilities and buildings, it was considered advisable to raise the existing ground level of various building sites. Some 3,000,000 cu yd of material were moved by hydraulic dredging. The $1,132,000 project was completed in May, 1949, by the Standard Dredging Corp. and the San Francisco Bridge Co.

Other construction contracts concluded or under way include: $2,158,000 worth for buildings for administration, instrumentation, test and evaluation, small missiles, transmitters and receiver, by the Alliance Construction Co.; about $1,500,000 for a telephone building, hangar, security building, housing and a sewer system, Robert E. McKee Co.; $1,040,000 for runway construction, Griffith Co.; $666,000 for a water and gas system, Ventura Pipe Line Construction Co.; $530,000 for the main base road, a drainage ditch and a recreational facility, Gridley Construction Co., and $442,000 for installations on Santa Cruz Island, E. R. Sipe Co.

Concrete lining pushed on Grand Coulee canal

Large-scale concrete placing has been resumed in eastern Washington on the lining of the feeder canal linking the Upper Grand Coulee with the reservoir behind Grand Coulee Dam on the Bureau of Reclamation's Columbia Basin project. Completion is scheduled for Oct. 1.

The canal has a greater capacity than the All American Canal (16,000 second ft as compared to 15,155 second ft) but is considerably shorter (2 mi as compared to 80). All the Columbia River water which will feed the vast Columbia Basin project south of Coulee Dam will be pumped 280 ft up through a dozen 12 ft dia discharge pipes into the canal.

Although the canal is scheduled for completion this fall, water will not start flowing through it until next May.

J. A. Terteling & Sons, Inc., has the contract both for the canal and the North Dam, which blocks off the coulee. It lined some 600 ft of canal last year, has another 8,900 ft to line this year. The canal is about 50 ft wide at the bottom; will take water to a depth of 27 ft.

Two 23-Story Buildings Tied Together

FOLLOWING CLOSELY on the heels of workmen, the Standard Oil Company of California is progressively occupying a 23-story addition to its San Francisco home office—and expects to be in full *possession by the end of August*.

The addition is joined to the existing structure to reduce earthquake hazard and prevent differential settlement. The two steel frame buildings are tied together by (1) Shear keys made by omitting window openings in the old structure, (2) a common wall for the top six floors and (3) miscellaneous minor ties.

Because the structures have different vibration periods, the joining was necessary to prevent damage during an earthquake—the two buildings might bang together. The shear keys are essential to prevent differential settlement because the structure is located in an area of general subsidence resulting from the consolidation of deep underlying sedimentary soils.

The original unit, completed in 1922, was U-shaped with legs of 137 and 206 ft. The new structure will make the building U-shaped with the legs of equal depth (but of different width).

Connecting halls between the two structures and identical external architectural treatment will make the building one unit. To handle the new traffic load, six elevators are provided in the new structure to supplement nine in the old.

• **Lateral force design**—The old structure was designed before the San Francisco building code included provision for earthquake forces. Thus it was required to sustain a 20-lb per sq ft wind load. This entire horizontal force is resisted by the steel frame.

The code under which the new building was designed required an earthquake factor of 2% gravity. But only 1% of this is resisted by the steel frame, the other 1% being taken by the reinforced concrete walls and floors (except in the first three floors where extremely high windows reduce the concrete and require that the entire 2% gravity earthquake factor be resisted by the steel frame).

Because the new unit is relatively narrow as compared with the depth, wind load (20 lb per sq ft) governs in the end frames. Due to the shape of the structure, this force is equivalent to 1.48% gravity and is entirely resisted by the steel frame.

The spandrel walls of the two structures are different, the original unit

HOW OTHER BUILDING ADDITIONS IN SAN FRANCISCO HAVE BEEN HANDLED

Not only the Standard Oil Building but four other San Francisco structures have been enlarged by additions in recent times. Two of the new additions were constructed as separate and distinct structures with no physical ties to the old unit. The other two were made integral parts of the original unit in this—as the Standard Oil building.

Because so little is actually known about behavior of structures under earthquake conditions, these five structures will provide interesting full scale data in case of another major San Francisco tumbler. For example, some light may be shed on space that should be left between structures—either separate units built up to the property line or two parts of the same unit structurally separated. Complicating all of this is the possibility that even the slightest differential settlement of foundations will throw a high building inches out of plumb.

The Pacific Gas & Electric Co. building addition illustrates the separation of structural units. The twelve-story addition is around the corner from an existing fifteen-story structure. Hill & Prescott, structural engineers on the job, specified a 6-in. separation between the two structures because the new unit differs not only in structural frame but in type of foundation. The old PG and E building is on separate footings, the new on a solid concrete mat. The old building was designed for wind load only, whereas the new wing is designed for an earthquake loading of 5% of gravity with concrete walls for stiffening. The only access between the two buildings is at corridors where sliding plates permit relative movement.

A similar situation is involved in the new wing for the Matson Navigation Co. building located on the other side of the same block as the PG and E addition. This job, designed by Leland S. Bryant, consulting engineer, involves a new wing designed with the use of earthquake factors, added to an old structure designed only for wind load. Both units are pile supported, both are designed for a full fifteen stories plus penthouse. The new addition, however, was only built seven stories high—it will be extended the full 15 floors when needed. Here again due to the difference in the structural frame, the buildings were completely separated with a 4-in. space allowed between.

Selection of 4 in. in the Matson case as compared with 6 in. in the PG and E case is a matter of engineering judgment. That's because exact computation of vibration amplitude under earthquake action of a building frame is difficult if not impossible. Other engineers might sponsor valid reasoning that leads to no separation of the structures or to a separation significantly greater than 6 in.

In the Matson case, deep steel beams with moment connections provide lateral force resistance. The buildings are interconnected with sliding plates at the corridors and copper expansion joints, making a dead air space for the 4 in. between buildings.

In the Matson structure also, lightweight aggregate (Haydite concrete) was used from the first floor level up, to reduce load on the pile footings.

Contrasting with these structures are two jobs designed by L. H. Nishkian and B. L. Nishkian, San Francisco consulting engineers. In one case, an eleven-story steel frame structure was added in 1940 to an existing eleven-story building constructed in 1917. This combined structure houses the home office of the Bank of America. Here the wall of the old building was cut completely away, and the steel frame of the new structure physically joined with the steel frame of the old. This made a much larger building with a single structural frame. Since this building is only eleven stories high and since the length to width ratio is not very great, this could be done without danger of damage from earthquake.

A similar instance was handled by the same engineers in expanding the nine-story Western Merchandise Mart in 1946. Because of the relatively low height it was possible to make the two reinforced concrete buildings one structure. In this case, the existing wall built in 1938 was cut away and double columns built at the junction plane. The fact that both portions were designed under the same code, using the same earthquake factors added to the feasibility of a unified structural frame.

using brick and the new lightweight concrete. This means that there is more weight in the walls of the old unit.

• **Six-story common wall**—The major physical tie that will prevent separation in the event of an earthquake is a common wall for the top six stories.

Four stories of this common wall were made feasible by a set-back on the old unit from the nineteenth floor up (this is actually the twentieth floor because there is an unnumbered storage room floor just below it). Under the new construction program, this set-back is being eliminated at the junction of the two buildings.

New columns required for the outside wall section of the old building are tied into the common wall, as are columns for the new extension. This wall is heavily reinforced concrete 10 in. thick, and columns of both old and new structures are tied into it.

The other two floors of common wall are just under this old set-back. Brickwork on the eighteenth and nineteenth floors of the old building was removed to permit the wall construction. Here the existing columns of the old unit and the columns of the new unit are tied into the wall by wrapping 2-in. round bars at 4-in. centers around the adjacent columns.

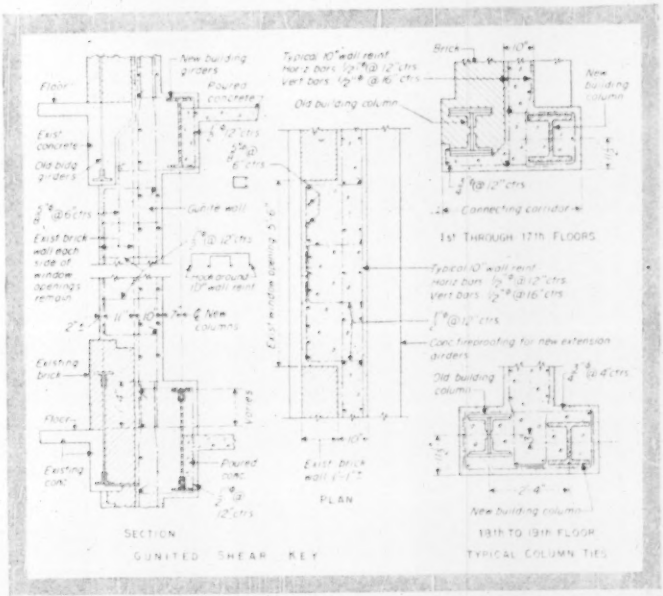
Other tie-ins are provided in each of the lower floors where corridors are cut through between the buildings. Here concrete walls with substantial reinforcing are installed partly around the existing columns adjacent to the corridor. These walls thus form structural parts of the new building.

• **Shear keys**—Original plans called for completely tearing out the wall of the existing building that is adjacent to the new addition. Then one new wall common to both buildings and tied into both frames would have been built for the entire height. Other early discussions included consideration of welding plates between columns of the two units at various building levels.

However, further analysis indicated such a tie was unnecessary. Further, when the contractor dug into the existing wall, he found that the brick construction was extremely good. It was a solid, 1-ft thick brick wall that extended up to the nineteenth floor, supported, of course, by the steel frame. At each floor level from the fifth up, the brick wall had five window openings, 5 ft 6 in. wide by 7 ft 8½ in. high.

To assure uniform vertical movement of the two structures, these window openings were plugged with

TO REDUCE EARTHQUAKE HAZARD and prevent differential settlement, this 23-story addition was tied to the existing building.



DETAILS SHOW HOW ADJACENT COLUMNS of the two buildings were tied together with reinforced concrete; shear keys were gunited in existing window openings.

gunite—the plugs acting as shear keys. The brickwork is considered well able to resist compressive forces.

In effect this means that the 10-in reinforced concrete wall of the new buildings has four 1-ft extensions into the old building at each floor from the fifth through the eighteenth. The fifth window opening at each floor was cut out for a connecting corridor. These shear keys were heavily reinforced to make them a definite part of the wall system of the new building.

Construction of the shear keys was delayed until late in the construction program so that almost all the dead load would be on the new frame and initial consolidation of the underlying soil would be relatively complete.

Lightweight concrete (Haydite aggregate) was used in the new structure to equalize the unit pressure exerted by the concrete mat footings of the two structures. The lot limits restricted the area of mat footing for the new structure. Thus, plus a heavier concentration of walls for elevator shafts, etc., made use of lightweight concrete necessary.

Because heavy rolled sections were not available when the original building was constructed, the wind girders were made of relatively complicated built-up sections involving deep gusset plates. These extended about 5 ft above floor level. These wind girders in the middle bay of the old structure at the junction section were cut to provide corridors between the buildings.

In general the procedure involved cutting out the top gussets and the top part of the built-up girder. Then a new upper flange for the girder was provided by welding heavy angles on each side of the existing web. The depth of the new building provided ample resistance to forces in the direction of these girders. Thus some of the material could be omitted.

Of interest in this job is the fact that the same architectural, structural engineering, mechanical engineering and construction firms were involved on the two jobs, almost 50 years apart. Architects on the new addition are Harry A. Thomsen and Aleck L. Wilson; they are successors to the old firm of George W. Kelham which designed the original structure. H. J. Brunnier was structural engineer on both jobs.

T. B. Hunter did the mechanical and electrical design on the new unit; on the original unit it was done by Hunter & Hudson (same Hunter both times).

The original building was constructed by the firm of Lindgren and Swinerton; the new structure is being built by that firm's successor—Swinerton and Walberg Construction Co., San Francisco. The American Bridge Co. did the steel fabrication and erection on both units.

Supervising the job for the Standard Oil Company of California is the building design and construction department headed by E. P. Wright and assisted by J. E. Rinne.

Filling of Lake Mead with Silt Estimated to take 445 Years

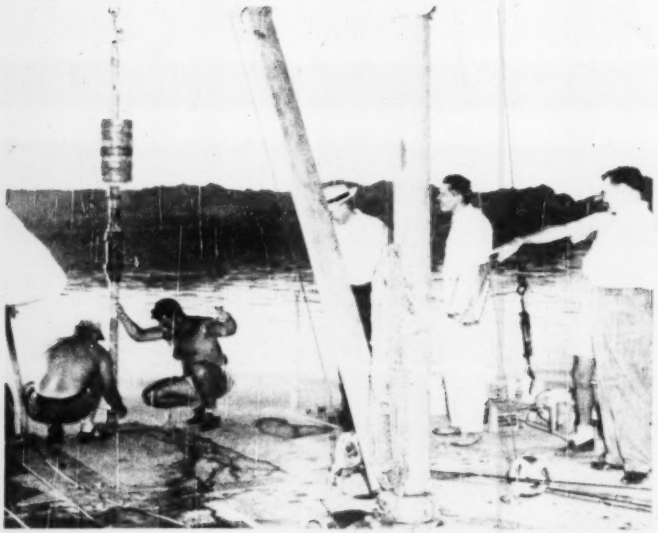
A study of the rate at which Lake Mead is being filled with silt, just completed by scientists of the U. S. Geological Survey, concludes that the reservoir behind Hoover Dam will be filled with silt and sand by the year 2380 A.D., 445 years after the completion of the dam. However, as the construction of other dams farther upstream is planned, the useful life of the reservoir should extend over many centuries.

The study, which was made at the request of the Bureau of Reclamation, has been under way for two years. It involved the taking of 1,600 cores, some as long as 90 ft, through the silt deposits using techniques developed by oceanographers. The U. S. Navy Electronics Laboratory and the Navy Hydrographic Office assisted in this work and in determining the amount of silt now in the lake and the manner in which it is consolidating.

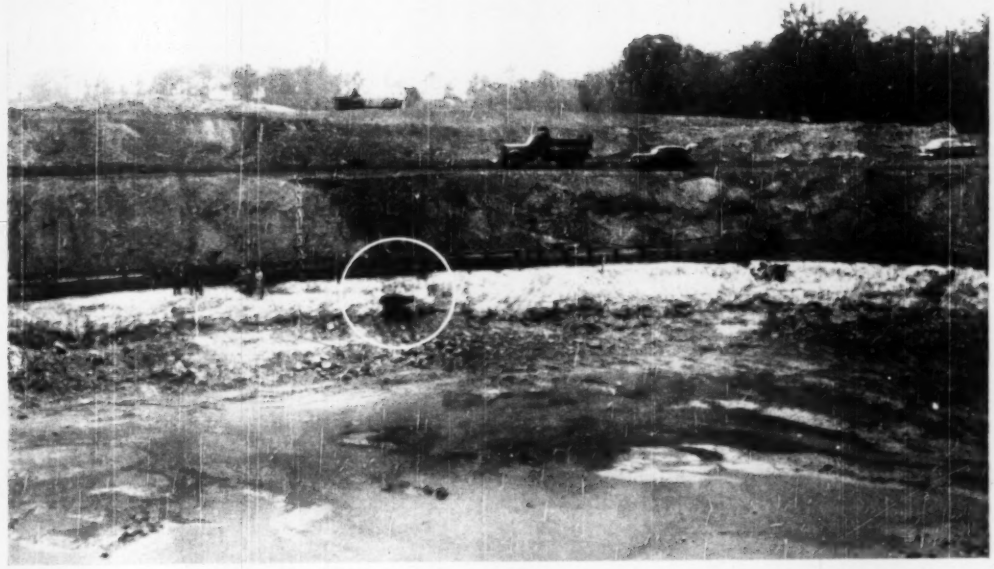
The present amount of silt is placed at 1,423,000 acre-ft. The total capacity of the reservoir, at spillway level with the gates raised, is now 29,827,000 acre-ft, as compared to the original capacity of 31,250,000 acre-ft.

Included was a study of the amount of dissolved salts in the waters of the lake and a determination of whether the presence of large beds of soluble salts in the submerged areas would seriously affect the quality of the water drawn from the reservoir. The latter tests were found to be groundless.

The dissolved mineral solids are principally silica and salts of calcium, magnesium, sodium and potassium. Apparently calcium carbonate is being deposited from the water during storage.



WEIGHT ASSEMBLY being attached to a free-fall sampler on one of the Navy barges used in measuring the silt deposits for calculations of the amount of silt in Lake Mead and its rate of consolidation.



LAYER OF LIMESTONE below cofferdam shows up here as excavation proceeds. It's porous, but not leaking seriously. A curtain of sanded intrusion grout seals its pores. An enlargement of the encircled area appears below.

Cofferdam Grouting At Jim Woodruff Dam

Fred A. Robeson
Chief, Soils and Geology Section
Corps of Engineers, Mobile, Ala.

William E. Webb
Project Geologist, Jim Woodruff Dam
Chattahoochee, Fla.

CLOSE-UP of the rockface shows how grout (colored with lampblack) tightly fills voids in rock.

SANDED INTRUSION GROUT solved the difficult inwatering problem in recent excavation for the navigation lock at Jim Woodruff Dam, Chattahoochee, Fla. Subsurface exploration showed that the usual cofferdam and wellpoint control of water would not do. A grout curtain was needed in the porous Tampa limestone under the cofferdam.

Grouting was used not to stop leakage completely, just to reduce it to an amount easily pumped away without impeding construction activity. Results have been highly satisfactory.

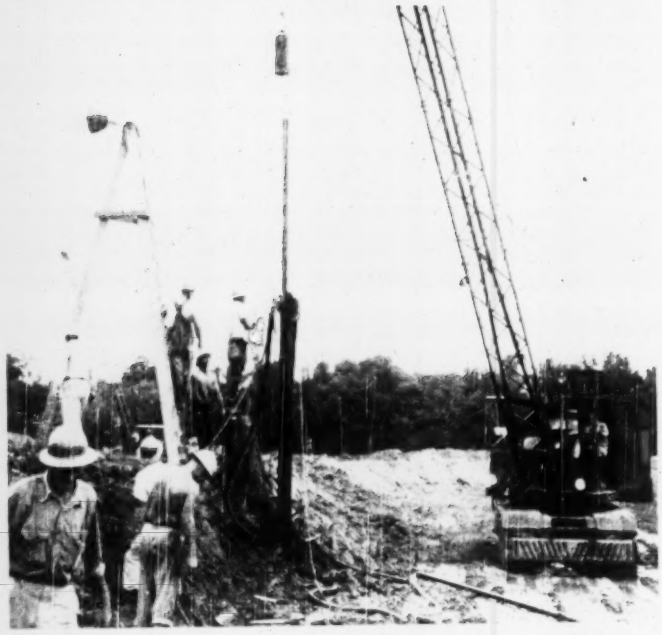
This pre-excavation grouting operation is believed to be the first such application of the type of grout used. In addition to water, portland cement and sand, ingredients included two patented admixtures used to prevent segregation, early stiffening and shrinkage.

• Investigations proved need—Jim Woodruff Dam is being built across the Apalachicola River where it is formed by the confluence of the Flint and Chattahoochee. The navigation lock is within 300 ft of the stream's west bank. Excavation has been carried to 50 ft below normal river level.

Experience on an earlier contract—an earthfill dike east of the river—indicated dangers of the water-bearing rock. Excavation on this earlier job was a full 1,000 ft from the river and went down only 20 ft below normal river level, yet wellpoints and sump pumps were needed, and a neat cement grout curtain had to be placed below the cut-off trench.

Grout consumption was high and frequently did not materially reduce inflow of water into the excavation. This pointed to the need of a sanded grout for the lock excavation—for economic reasons.

Subsurface exploration further de-



SETTING GROUT RISER through hole puncher. Hole already has neat cement grout in it. Driving riser into this resulted in effective seal.

timed the necessity of placing a grout curtain. Core drilling, water pressure tests and a study of two 36-in. diameter drill holes all helped to guide the choice.

Limpia limestone that underlies the site varies from soft, granular and earthy to dense and crystalline and contains many weathered zones. Weathering, leaching, oxidation and solution channels are prevalent. Below the Limpia limestone is relatively unweathered and impervious layer of sandy limestone shales that is Sutphen Limestone, another slightly water-bearing rock. The grout curtain was carried only to the middle, impermeable, layer of solid, unweathered limestone.

• **Grout ingredients**—Admixtures in the grout are two patented products of the Prepakt Concrete Co., of Cleveland, Ohio. The first, Alfesil, is a pozzolanic flyash high in silica that acts as a filler. It separates the cement particles, preventing their flocculation, and combines with lime released in the cement to form a stable compound. The second, Intrusion Aid, creates a film at cement particles that gives the mix the properties of a colloidal suspension, keeping its constituents from separating at frequent trouble with standard grout. It eliminates setting shrinkage, producing instead an expansion of the grout just prior to initial set. It also helps prevent early stiffening of the mortar, easing pumping through supply lines and rock voids. By slowing initial set to 20 hours, this admixture also permits washing the grout riser, making redrilling for the next stage of grouting unnecessary.

• **Grout mixes**—Suitable grouting mixes and procedures were developed by trial and error, since little information on this use of intrusion grout could be found.

At first, a local, unprocessed flood-plain sand deposit adjacent to the job was used. But this did not meet the recommended grading specifications. Its fineness modulus was 0.83, and it required hand screening at the mixer to remove roots and other foreign matter.

Trial mixes using this sand were set up in the laboratory to range from zero to 12 parts of sand to one part of neat grout. Neat grout consisted of one sack (94 lb.) of cement, one sack (75 lb.) of Alfesil, and 2.5 pounds of Intrusion Aid as constant proportions. Varying amounts of sand and water were used in the trial mixes. The optimum water content of the trial mixes was that amount which produced a viscosity described as "thick cream consistency." This water content is important because mixes with more than the optimum water tend to shrink instead of expand upon setting.

A wide range of sanded and unsanded grout mixes was used in the early experimental stage of field grouting. Unsanded mixes containing 11, 13, 30 and 50 gal of water respectively were the most common. Most generally used of the sanded mixes were those containing 4 parts of sand and 24 gal of water, 6 parts of sand and 30 gal of water, and 8 parts of sand and 40 gal of water. Cavernous areas required use of a mix containing 10 parts of sand. However, to prevent clogging at the start, grouting in each hole was started with an unsanded mix.

The experiments dictated a better graded sand. A 50-50 combination of the local sand used in the first trial mixes and the river sand that was being produced commercially nearby.

The resultant grading was very near that recommended by the Prepakt Concrete Company and had a fineness modulus of 1.27. The apparent advantages in the field for this improved sand blend are: (1) decreased water content, (2) less mixing time to produce a homogeneous grout, and (3)

INSTRUCTIONS TO INSPECTORS

"Grouting of each hole should begin with an injection of intrusion grout without sand to lubricate passageways and prevent the fouling of holes with small void space through errors in judgment in choosing the initial sanded mix. The particular intrusion mix without sand will be chosen in the field but should conform to those shown on the laboratory volume tables. Inject the unsanded mix in sufficient quantity to fill approximately 10% of the estimated void space. If the hole shows any indication of building up pressure, inject an additional 10% of unsanded mix to determine the possibility of grouting the hole to refusal with this type mix. If the pressure does not increase, change to intrusion grout with sand. The sand in this mix should be progressively stepped up until the heaviest, desired mix is reached. Continue pumping until the computed quantity of grout is injected or until the hole refuses at maximum pressure; however, the total quantity needed is subject to the inspector's decision based on hole conditions."

higher proportion of mortar for a given quantity of sand.

• **Grouting procedures**—After some experimentation, engineers obtained a satisfactory seat for the grout riser in the rock by jetting a 6-in. ID heavy gage casing or hole puncher to the top of rock, and churn drilling a 5-in hole 2 ft into rock with a guide equipped cable tool.

Several methods of sealing the grout riser, after inserting it into the hole, were only partially successful; these were discarded in favor of pouring a neat cement mix into the hole, then driving the grout riser to the bottom. This resulted in an effective seal in most cases. The casing was pulled, following this operation.

Cofferdam grouting was done in stages, each stage being about 15 ft in depth, unless circulation was lost at a lesser depth, which then became the bottom of that stage. Total depth of hole was governed by the elevation of the relatively unweathered layer of sandy limestone referred to on the preceding page.

Pressures used in the first stage followed the general rule of 1 psi per ft of depth including the overburden. Pressures for second stage varied according to the rock conditions encountered, using as a basis curves presented by Creager, Justin and Hinds in "Engineering for Dams," Volume I.

Grout holes were drilled 2½ in. in dia with primary spacing of 20 ft between holes. Intermediate holes were drilled halfway between primary holes. With few exceptions, results in the secondary holes indicated that grout had traveled about 10 ft from the primary holes.

On this basis, a tentative grouting goal was to fill the estimated voids in a 10-ft radius around each grout hole.

Void space was computed on the basis of leakage tests, experience from grouting other holes in the area, exploratory core borings and estimated size of voids.

• **Grout plant**—Intrusion grout was mixed in a movable plant with two skid mounted tandem drum mixers each 6 ft long by 3 ft in diameter. The grout pump was able to pump from either drum. This pump, also skid mounted, is double acting, 6-in duplex, having bag valve openings, removable valve seats, and removable liquid end liners of hardened alloy steel. Pistons are molded rubber with forged steel hubs. Rubber valves are provided with special steel insert seats. The grout plant and mixer are driven by compressed air at 100 psi, supplied from a central compressor plant of 1,200-cu ft capacity.

EXCAVATION to a depth of 30 ft below normal river level was possible with little pumping—thanks to curtain of sanded intrusion grout.

Ingredients were placed in the mixer through an 18-in slot by dumping from wheelbarrows except water and Intrusion Aid. To more completely and equal mixing the following sequence of materials was used: (1) water, (2) Intrusion Aid, (3) Alfesil, (4) cement and (5) sand. A small amount of lamp black coloring was added to provide easy identification of the grout. The mixing time varied from 2 to 4 minutes, depending on the sand and water content.

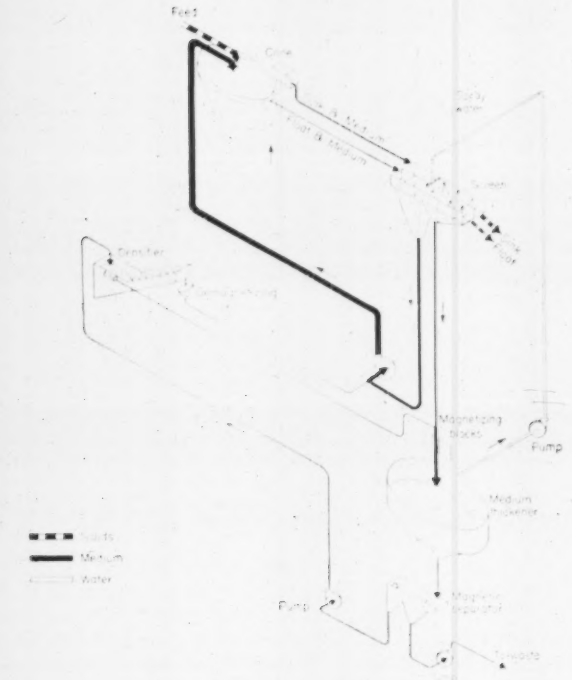
Grout was pumped from the mixing plant to the grout holes through 2-in ID high pressure hose connected to the grout hole by a header arrangement equipped with pressure gage, bypass valves and a return line. Sanded intrusion grout has been pumped as much as 300 ft from mixer to grout hole.

• **Results**—Cofferdam grouting for the entire lock excluding the upper guide and guard wall section, has required the following quantities: 5,431 ft of drilling, 2,824 ft perimeter of grout curtain, 132,020 cu ft of grout (an average of 28 cu ft per ft of drill hole), 22,938 bags of portland cement, 94,270 cu ft of sand, 22,858 cu ft of Alfesil and 62,660 lb of Intrusion Aid.

Several minor water flows are present in the excavated area, but numerous grout pings are observable in the walls of the cut, especially in the zone of intensive weathering about 3 ft below the top of the rock—and these have apparently effectively sealed off extensive water inflows. During last March, the river rose approximately 10 ft, and only a slight increase in water inflows into the excavation was recorded as a result of the rise.

Specifications were set up to minimize greatly the contractor's risk in unwatering the excavation. This was accomplished by establishing fixed unit prices for such items as pumping from protected areas, drilling grout holes, portland cement, sand, and admixtures in intrusion grout. The fixed unit prices were set below the actual cost of such operations to prevent exploitation of any item.

Work on this second major construction contract at Jim Woodruff Dam was started early in June, 1949, by Perini, Walsh, Mills, and Blythe Brothers Construction Companies, contractors for the lock and fixed crest spillway construction. Work was performed under Thomas L. Highsmith, resident engineer for the Corps of Engineers. Col. W. K. Wilson, Jr., is district engineer of the Mobile District. William E. Webb is project geologist.



STEPS IN HEAVY-MEDIA SEPARATION by which poor-quality stone can be removed from gravel. Gravel and heavy medium are fed into cone separator where material heavier than the medium sinks, lighter material floats. Both move to screens where the medium is washed off to be reclaimed. Light material is wasted and acceptable material goes to stock piles.

See Construction Use For Fast-Growing Mining Process In Improving Gravel

A process known as heavy-media separation—by which a valuable ore can be separated quickly and cheaply from waste material—is quite common in metal mining, and is catching on fast in coal mining.

Present indications are that the process will prove equally useful in construction—as a means of improving coarse aggregates for concrete.

Proponents claim that two materials, if there's a difference of specific gravity, can be separated by HMS, the float-sink method.

No matter what kind of separatory vessel you use—a cone, revolving drum, or screw separator—the principle is the same. By close, and easy, regulation of specific gravity of a fluid heavy medium, it is possible to float one material while others sink.

In most beneficiation, the goal is floating rock sinks while worthless gangue floats on the surface. Used to clean coal, heavy-media separation not only removes refuse, ash and sulphur, but also separates steam coal from higher grade caking or metallurgical coal.

• **How about gravel?** Specification writers are becoming increasingly aware of quality control on concrete ingredients. There is growing concern about compatibility of materials. Aggregate must not only be strong; it must have given qualities regarding expansion and contraction under temperature change, reaction with cement, water or admixtures, and color or discoloration.

Heavy construction has moved to remote places; the specified aggregate is not always readily available. Washing and screening sometimes will not separate harmful components from good sound gravel of the available source. But heavy-media separation will do the job, if there's a difference in specific gravity—in a size range 1½ in. to 3/8 in.

So far, it has been given the chance but once.

At Rivers, Manitoba, the Royal Canadian Air Force has put an HMS mill to work on local gravel containing much harmful shale. In so doing it has saved an estimated $2.20 on each cubic yard of aggregate used in the 120,000 cu yd of concrete pavement on new runways.

The nearest commercial source of good gravel was 165 miles from the job; the freight rate was $2.51 per cu yd. Total cost of imported material, including its purchase price, freight and unloading charges, was estimated at $3.90 per cu yd. Total cost of the local material was about $1.70 per cu yd, of which only 7 cents went toward HMS plant operating costs.

Western Knapp Engineering Company of San Francisco built the mill for the RCAF. American Cyanamid Co. tested samples from the job at its Stamford, Conn., pilot plant and gave technical advice on specific gravities and mill design. Representing American Zinc, Lead & Smelting Co. (controller of patents on the process) American Cyanamid runs tests, recommends equipment, assists in start-up of plants and trains operating personnel.

Shale in the Canadian gravel bank had a 2.0 specific gravity; usable gravel averaged 2.6. Shale was effectively eliminated in a mixture of water and magnetite (commercially available in proper grades) having a specific gravity of 2.45. Rate of feed reached 80 to 100 tons per hour, with a separation from which 75% was reclaimed, 25% wasted.

• **Operation details**—HMS plants can

handle materials with specific gravities between 1.25 and 3.75, and the process can separate those with specific gravities varying as little as 0.01—within the proper size range. Magnetite in water is used with lighter materials like coal; ferrosilicon in water handles heavier jobs such as iron ore or diamonds. The two can be mixed (with water) to obtain any desirable intermediate specific gravity. With either or both of these magnetic compounds, close control (even automatic control) of specific gravity is possible; both stay in suspension without much agitation; each is easily recoverable by magnetic action.

In actual operation HMS mills pass treated material while the heavy medium circulates in a close system. Loss of medium is nearly negligible—about 1 lb. for each ton of raw material treated.

Belted into the mill, the raw gravel of acceptable size (50-in. to 8-in.) enters the separatory vessel (containing heavy medium. Stones below the fixed specific gravity of the medium float on top of the cone (or whatever type vessel is used). They overflow a weir to be carried across a vibrating screen under a water spray that washes the medium off. The float material is then wasted.

Stone of acceptable quality sinks to the bottom and is conveyed by an air lift up to the same vibrating screen (divided to keep float and sink materials separate). Most of the medium carried along with the gravel drains from it through the screen and is recirculated directly back into the cone.

That "medium" which has been washed from the product goes through a cleaning process. A magnetic separator lifts the magnetite or ferrosilicon out of the slurry of water, sand and clay that has formed. Clean magnetite (or ferrosilicon) results and is passed on to screw type densifier that dewaters it. From the densifier it drops through a demagnetizing coil and then the medium is ready to be fed back into the cone.

Sizes of units vary widely, as do types. The mill in Manitoba is prefabricated; six men bolted it together in six days. It has a 7-ft cone and a 5-in square pipe from cone to screen. One man with a week's training can run the plant.

• Many sizes, many uses—Other plants—there are now 55 operating and 19 under construction for beneficiation of 16 different materials—vary in size from those treating just a few tons per hour for the new Jones & Laughlin Steel Co. installation at Brownsville, Pa., which handles 2,000 tons of bituminous coal per hour.

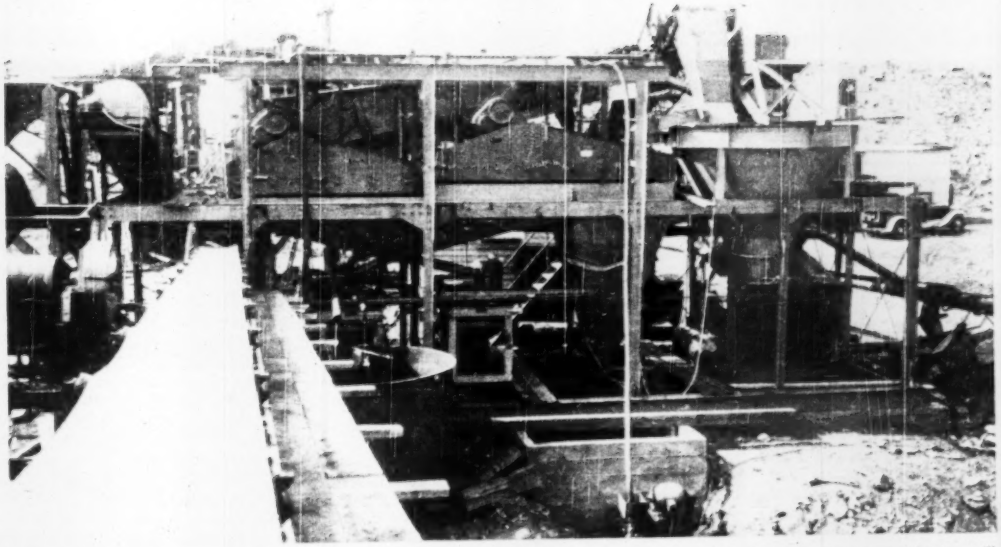
At American Cyanamid's Stamford (Conn.) laboratories the mineral dressing division has a small warehouse full of samples waiting to be tested in the HMS pilot plant. Miners want recommendations on what the process can do for them. Samples come from the world over and range in quantity from a bushel to a carload.

There are relatively few gravel samples being run—maybe two a month come in. Most senders are producers of rock products who don't want their competition to know they are interested in HMS. So American Cyanamid won't name names of the people who are getting serious about the process.

However, it is public information that the Corps of Engineers had a test made in 1946 for the Omaha soils and materials laboratory on gravel from near Geddes, S. D., under study for Fort Randall Dam. A report on results of the tests, issued in June, 1947, by the Corps of Engineers, went into great detail in evaluating results and concluded:

"The investigation appears to indicate that the proposed process for beneficiating gravel . . . by heavy-media separation is feasible, providing the resulting product will meet durability requirements. . . . It is also important that it be possible to produce the beneficiated material economically as a field procedure."

Proponents of the process are optimistic. They expect its use with gravel to catch on and eventually be second only to coal. As one puts it, "It's just a matter of getting that last olive out of the bottle."



MOBILE MILL treats 100 tons per hour when used on iron ore. Material enters separatory vessel (cone) at right and leaves mill, separated, at left end. (Western Machinery Co. photo)

Metallizing Makes . . .

An Old Water Tank Like New

John E. Wakefield
Metallizing Engineering Co., Inc.
Long Island City, N. Y.

When A. C. Walter, water superintendent at Dansville, N. Y., found that the 65,000-gal. elevated wash-water tank at his filter plant was in bad condition, he called in specialists in metallized protection.

As a result, his tank has been made "as good as new" at a cost of $4.12¢—about $3.60 per sq ft of surface. It was done by grit-blast cleaning and placement of a 0.010-in. zinc coating on the inside of the tank.

The job was far from normal because much extra work was called for to regain structural strength lost through corrosion. Also, two delays resulted from the necessity of utilizing the tank during the job. But for the results accomplished, a tank salvaged and leaks stopped—Walter feels that the unit cost is more than justified. Moreover, the fact that the work could be stopped to permit temporary utilization of the tank was an added advantage.

• **How the job was done**—When corrosion of the tank and standpipe became evident, Walter called in C. K. McElroy, executive vice president of Metal Cladding Inc., Buffalo, N. Y. They arranged to drain the tank at a time that would not interfere with filter-plant operation and make a careful inspection of its interior.

The inspection revealed hundreds of long, deep pits, both in the standpipe and tank—some of these were more than 0.25 in. deep. Welding of the deepest pits was therefore indicated to restore essential structural strength.

Normal cleaning procedure calls for two-step blasting—with fine and coarse grit. But the experts felt that this might open up leaks at points of the worst pitting. So they decided to sand-blast lightly, weld up the deep pits and then prepare the surface with coarse-grit blasting just before metallizing.

Metal Cladding's crew—with the help of filter-plant personnel—set up the compressors, blast generators and piping at the foot of the standpipe. And the crew completed the preliminary cleaning of the tank's interior and truss rods in four days. Ottawa flint sand was used in the portable blast-cleaning equipment at 100 psi. This operation opened up a number of leaks that had not been uncovered in visual inspection (mostly at the seams).

It was at this point, Walter recalls, that it became necessary to wash several filter beds. So the tank was filled, the beds washed, and the tank redrained. The work was held up, but no damage done, he says.

• **Pits welded**—The deep pits were then filled by electric-arc welding. Loose rivets as well as lapped seams were also welded. This operation, which took about two weeks to complete, restored much of the tank's original strength and provided a uniform surface for final blasting.

The tank was filled once again at the completion of this step and filters washed in anticipation of final blasting and metallizing.

After the tank was again drained and dried out, the crews started final cleaning operations. This consisted of blasting with a mixture of G-40 and G-18 angular steel grit at 100 psi. This mixture produces a very irregular texture that serves as an anchor for sprayed metal.

It is important to metallize a surface within four hours after cleaning, so blasting was carried on through an

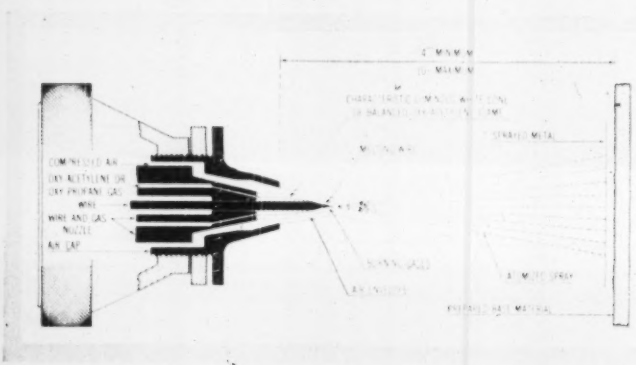
WHAT IS METALLIZING?

Metallizing is a process by which any metal, available in wire form, may be sprayed on any type of surface, which has been properly prepared. The two most useful metals for corrosion protection are zinc and aluminum, both of which are anodic to iron and steel.

Like any other process for adding or joining metals, metallizing demands a thoroughly cleaned surface. The surface, in addition, must be roughened to provide grounds into which molten particles can key. Cleaning and roughening can be by pressure blasting with abrasives.

Sand and angular steel grit are used for pressure blasting. After use, sand (which cannot be separated from rusty particles) is always discarded but—if it can be recovered—steel grit may be cleaned and used again.

MOLTEN ZINC was sprayed on the interior of the wash-water tank after grit-blast cleaning. Two "guns" speeded coverage of prepared surface.



ZINC WIRE, fed to the center of the nozzle, is melted by oxy-propane (or -acetylene) gas and sprayed onto the grit-blasted surface by compressed air.

8-hr shift. The section cleaned was then immediately metallized by the night crew. This prevents oxidization by collection of moisture on the freshly prepared surface. "Low humidity conditions", says McElroy, "facilitated our work".

"It's important," he points out, "to blast only as much area as can be metallized by the following shift. It's also a good idea to have adequate illumination for blasting because complete and thorough preparation of the surface is essential to successful metallizing. Blasting must be continued until the surface has a uniform dull grey appearance, free from rust, dark spots, and foreign matter."

• **Applying the zinc**—The "weight-area" system was employed for metallizing. This consists of measuring the area to be coated and weighing out enough zinc wire to give 0.010 in. thickness. (It takes about 0.47 lb of zinc wire per sq ft sprayed through the gun to deposit an average thickness of 0.010 in.)

Zinc coating is applied in layers. Each layer is put on at right angles to the previous one. The gun is passed from left to right just fast enough to cover the steel surface with zinc. The next pass is right to left, overlapping the first one slightly. This is repeated until the entire section is covered.

The next layer is applied vertically, the third horizontally, the fourth vertically, etc. until all of the weighed-out wire is deposited.

Total thickness of deposited layers is then checked with an electric gage. This measures depth of non-magnetic material on a magnetic base, an excellent tool for checking thickness of zinc or aluminum. "If we found any spots under 0.008 in.," says McElroy, "we immediately added enough zinc to bring them up to the specified thickness."

Welds, rivets and seams were covered with an extra 0.002-0.003 in. of zinc since such areas are critical.

• **Materials used**—The Dunkirk job consumed 1,400 lb of 1-in zinc wire to metallize the inside tank surface, 15 cylinders of oxygen, and the equivalent of 4 cylinders of propane. (Propane was employed since it was felt that acetylene was not stable enough to run the risk of using it in pipes running from the ground to the tank.) The cylinders, in addition, were connected to a manifold to prevent too rapid flow from any one cylinder and to save time of changing from cylinder to cylinder.

Surface cleaning required about 4 tons of 16-20 mesh Ottawa flint sand and five tons of angular steel grit. All but 500 lb of the grit was recovered on the job.

The tank was cleaned, strengthened and metallized in 22 days. Four days for cleaning, nine for welding pits, and nine for final blasting and metallizing. Total man-hours on the job was 546.

• **Service life**—Enough work has been done in the last 20 years to put metallized coatings in a very favorable light. Research into sprayed metals and their properties, in addition, has been carried out on a broad basis during the last six years.

Data from accelerated laboratory tests, from test panels exposed under actual field conditions and from such service reports as that given herewith for General Mills—have been gathered to predict life expectancies under various conditions. The predicted life of aluminum and zinc coatings under a number of fairly common conditions is given in the accompanying table. The preferred metal for each condition is indicated first with the recommended thickness.

• **Cost**—Based on life expectancies, sprayed metal coatings, are less expensive on a per sq ft per year basis than paints and other common coatings. Sprayed metal protection for elevated water tanks costs from $1.40 to $1.65 per sq ft depending on type and condition of the surface to be covered.

Similar protection for tanks on ground may cost as low as 50¢ per sq ft. The unit cost range of corrosion protection then reduces to 2.5¢ to 3.5¢ per sq ft per year (20-yr life expectancy), considerably less than 5¢ to 14¢ for painting and other organic coverings (four times in 20 yrs.). In addition, metallized coatings give electrochemical as well as physical protection.

LIFE EXPECTANCY OF METALLIZED COATINGS

Corrosive Condition	5-10 Years	10-20 Years	20-40 Years	Over 40 Years
Rural Atmosphere		.003" to .005" Zinc	.005" to .007" Zinc	.010" to .012" Zinc
Industrial Atmosphere		.006" to .008" Aluminum .006" to .008" Zinc	.010" to .012" Aluminum .012" to .015" Zinc	.012" to .015" Aluminum .014" to .016" Zinc
Salt Atmosphere	.006" to .008" Aluminum	.008" to .010" Aluminum .010" to .012" Zinc	.010" to .012" Aluminum .012" to .015" Zinc	.012" to .015" Aluminum .014" to .016" Zinc
Fresh Water Immersion	.006" to .008" Zinc .006" to .008" Aluminum	.010" to .012" Zinc .008" to .010" Aluminum	.012" to .015" Zinc .012" to .015" Aluminum	
Salt Water Immersion	.010" to .012" Zinc	.014" to .016" Zinc		

(Source: Metallizing Engineering Co., Inc.)

ZINC COATING IN SERVICE FOR MANY YEARS

In Sept. 1934, two water-tanks at General Mills, Inc., Buffalo, N. Y., were inspected and found in bad condition. It was decided to metalize. However, due to the very bad pitting at the water line, patchwork was necessary before the metallizing could be done.

All interior surfaces except the domes were carefully blasted, and coated with .004 in. metallized zinc. At the water line, thickness was increased to .006 in.

Tanks have been inspected yearly, and, until 1947 were in excellent condition. In the 1947 inspection, it was found that the zinc had pretty well dissipated at the water line. The rest of the coating, however, was still good in 1949.

At the time these tanks were done, metallizing equipment was rudimentary and hard to operate. There was, moreover, no accurate method of checking coating thickness.

Considering the probable thickness of the zinc, the service life is considered not only highly satisfactory to General Mills, but quite remarkable, to those experienced in metallizing. Most of the coating is still in good condition. Even the water-line section stood up for almost 14 years.

Plan for Quantity and Quality in Lighting

For construction economy and efficient operation, all components of a building must be integrated in the design. That's why if you plan the lighting properly, you produce a better building. Phelps Meaker of the Engineering Division of General Electric Company's Lamp Department presents some fundamental principles to guide you.

IN PLANNING a lighting installation, architects and engineers are confronted with two questions: (1) How many foot candles should be provided for the kind of work the occupants will be performing? What standards of quality—freedom from annoyance, discomfort, glare, shadows—should be applied to lessen the psychological tension of the person doing visual work?

Quantity of light is important. You can see black print on white paper with about 1/100 ft candle, though with difficulty. But if you sew with black thread on black cloth you can barely see the thread under 10 times as much light. You can see big numerals on a wall calendar in dim light across a large room, but you take a telephone book to a strong light.

There is, however, more than candlepower to good lighting. For example, while windows let in abundant natural light, they very often frame incident or brilliant, cloudy sky that is many times brighter than any interior wall. Dark frames around the windows make the contrast even more annoying. You can offer some relief by using very light wall finishes.

Ease of a visual task depends on:

Size—As the image of an object becomes larger, more minute light receptors in the retina receive an impression of light.

Contrast—Differences in brightness or in whiteness and blackness—between a detail, such as a printed character, and its background produces a difference in stimulus of adjacent sense receptors. You can't see a black cat in a dark closet.

Brightness—In dim light, differences in stimuli from adjoining dark and light areas are minute, making seeing difficult.

Time—Have you noticed that in hunting for a small object, such as a pin on a rug, you often miss it in a rapid survey and have to make a careful, slower search before you find it?

In most cases, a task is fixed as to size, contrast and time. That's why brightness is so important, for it can be controlled by illumination.

• **High illumination justified.** Many people are accustomed to reading under 10 to 20 ft candles; they rarely complain unless they are forced to hunch to see for too long a time. Performance tests, however, have proved that where higher levels of illumination are provided, production increases and errors and spoilage decreases. People doing drafting or clerical work like 60 to 100 ft candles of comfortable lighting, though the benefits are humanitarian and cannot be measured in terms of performance.

Many people like 500 to 1,000 ft candles for reading outdoors. It is possible to provide these levels with artificial light, but only over a limited area. However, people do not like to sit very long in a pool of bright light in a field of comparative darkness.

• **Lighting quality important**—It takes great care to lay out lighting to provide 60 ft candles throughout a room, without shadows, glare, discomfort and annoyance. The light sources themselves may become a conspicuous and annoying part of the environment. Thus, lighting designers must consider the effect of surroundings on the visual and psychological well-being of the occupants, and this involves controlling quality of lighting.

Quality is considered favorable if:

1. Within the limits of the working area, the effort required in seeing does not vary substantially.

2. The surroundings of the work are free from conspicuous masses that compete for attention with the work detail.

Condition 1 takes account of shadows and non-uniformity of illumination. Also included is reflected glare—bright images reflected from the work surface.

Condition 2 considers contrast of background with the work area. When you raise your eyes from your work to look around the room, conspicuously bright fixtures and windows become annoying. A good rule is that work and immediate surroundings should be within three to one of the same brightness.

• **Effect of building design.** If abundant daylight is demanded, there is no substitute for large glazed areas. But illumination levels near the windows are high and taper off rapidly toward the distant walls. This condition can be improved with prismatic

ROWS OF FIXTURES in a drafting room placed parallel to the direction in which the draftsman face are not as annoying as when placed broadside.

glass blocks that bend rays of direct sunshine upward to strike the ceiling over the darker portion of the room. However, when the sun is above or below the angles for which the prisms are designed, the blocks themselves may become very bright. On exposures subject to direct sun, it is usually wise to provide blinds.

Control of window brightness is vital even if occupants do not face windows directly. Different types of blinds and diffusers, adjustable for the need at each particular hour of the day, are required to cut off direct sunshine and break up large areas of sky. Sometimes shades have to be almost opaque to avoid high, diffused brightness under direct sunlight. Considerable help is given by vertical or horizontal vanes outside windows, to intercept sunlight without obstructing the view.

Brightness of artificial light sources or of illumination also must be controlled. With ceilings less than 10 ft high, fixtures should have little brightness visible to a person sitting at a distant desk. Also, the tendency for eyes to rest on bright fixtures may be lessened if far walls are well illuminated and provided with large-scale patterns or luminous motifs.

• **Effect of color**—In many rooms, large amounts of light strike walls and ceilings and will be absorbed to an appreciable extent if these are dark in color. Therefore, they should be as light as possible.

An additional benefit accrues from this practice in that the entire environment is thereby lightened, reducing contrast between fixture parts and windows and the surfaces seen adjacent to them. Brightness ratios considered acceptable for various occupations have been published by the Illuminating Engineering Society.

To the lighting specialist, desirable tints are those with certain ranges of reflectance. Ceilings, 75 to 85%; walls, 45 to 65%; desks and furniture, 25 to 35%; and floors, 15 to 30%. Satisfactory form contrast without obtrusiveness can be achieved with only 15 to 20% difference in reflectance of adjacent surfaces. Reflectance is the percentage of light striking a surface that is reflected.

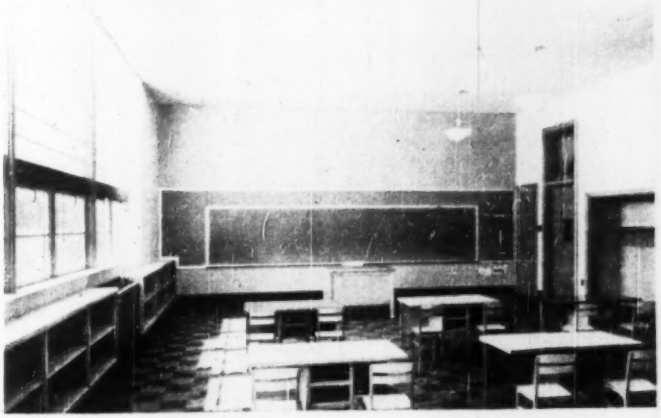
• **Glare factors**—A system of glare factors has been set up to facilitate the study of comfortable brightness in the room environment. Relatively new, these factors enable lighting specialists to predict the order of visual comfort that will be experienced.

Glare factors are derived from an empirical mathematical equation that evaluates the conspicuousness of luminous masses for the room as a whole as distinct from the actual work area. ("Glare Factors and their Significance," by Ward Harrison and Phelps Meeker, GENERAL ELECTRIC REVIEW, Aug. 1947, p. 31.)

Repeated appraisals of interior lighting have shown that when the glare factor does not exceed 15, the lighting will be found comfortable for the great majority of people. As a rough guide, the glare factor may be taken as the percentage of normal people who may be expected to complain about the lighting. In schools, offices and drafting rooms, 30 glare factor may be taken as an upper limit.

Editor's Note—*Two articles to be published in the near future will present methods and data for design of lighting systems and will indicate further the interrelationship of building design and lighting.*

VERTICAL VANES outside windows of the Petroleum Building in Los Angeles intercept sunlight without obstructing the view.



SCHOOLROOM is well lit near interior walls by light directed by prismatic glass block to the ceiling and reflected down. (Pittsburgh Corning Corp. photo)

BOOK REVIEWS

Beautiful Bridge Book

THE ARCHITECTURE OF BRIDGES—By Elizabeth B. Mock. 127 pp. Published by the Museum of Modern Art, 11 West 53 St., New York. $7.50.

Basically this is a picture book—and a very fine one—but most of its appeal and usefulness resides in the instructive and stimulating captions that Mrs. Mock has written. They are not arty, as is usual in similar books, but strike sensible degrees of emphasis between the necessary anatomy of bridges and their architectural aspects. The captions focus directly on the significant features of each structure, and the pictures have been selected with unusual discernment. Mrs. Mock is on the faculty of the School of Architecture of the University of Oklahoma but she is also the daughter of Jacob L. Bauer, former state highway engineer of New Jersey, which may account for her special appreciation of the effect of engineering on architecture. The book was produced under a grant to the Museum of Modern Art from the American Bridge Company.

British Highways

THE KING'S HIGHWAY—By Rees Jeffreys. 292 pp. The Batchford Press, London. British Book Centre, 122 East 55th St., New York 22. $4.25.

That the British government has failed in its efforts to provide adequate highways is the outstanding conclusion of a new book, "The King's Highway" by Rees Jeffreys. The book is a critical study of highway development in England during the past 60 years.

Mr. Jeffreys has been in close touch with road-building activities in England throughout most of his life. He was for 10 years chairman of the Roads Improvement Association, a private organization active in promoting good roads at the turn of the century. When the British government took a hand in road improvement in 1910 with the establishment of the Road Board, Mr. Jeffreys became the secretary of the board. Since his retirement from government service in 1918 he has actively participated in several International Road Congresses, one of which was held in Washington in 1930. David Lloyd George described Mr. Jeffreys in 1937 as "the greatest authority on roads in the United Kingdom".

The book points out that "the Ministry of Transport . . . has failed to provide an adequate road system". The author analyzes reasons for this failure and gives his own basic principles which he feels must be accepted if the highway systems of England, Scotland, Ireland, and Wales are to meet the needs of the future. He also describes trends in highway surfacing, location, design, and bridge construction from the English point of view.

Mr. Jeffreys feels that a study of highway finance and taxation should be undertaken to provide an equitable basis for distributing highway costs between road users and property owners. He believes that highway user revenue should be devoted to highway construction and improvements. That this has not been done is one reason for the ministry's failure to solve the road problem, in his opinion. He lists four factors which have hindered the ministry in its highway improvement attempts:

1. Highway policy in the past has been governed largely by political considerations.

2. No first class administrator was ever appointed Minister of Transport.

3. Railroad interests opposed government assistance in highway improvements.

4. The control exercised over transport finances by the Treasury has prevented the expenditure of funds on any long-term plan for highway development.

Another difficulty encountered in improving highways in Britain is due to the lag in mechanization of construction equipment and methods. The British government has used road work in the past as a means for alleviating unemployment and, hence, has officially discouraged any moves which might result in the displacement of workers. Reviewed by Thomas H. MacDonald, Commissioner of Public Roads, Bureau of Public Roads, Washington, D. C.

Pioneer Builder

UTAH LOTT—Dauntless Pioneer and Master of Missions. By J. L. Allhands. 187 pp. The Naylor Company, San Antonio, Texas. $2.50.

This book, written by a pioneer contractor who had a part in the development of Texas, is about another of the pioneers in the opening of a big section in Texas, Utah Lott. Lott began his pioneering ventures in Texas in Corpus Christi in 1866 and two years later began construction of a railroad westward toward Laredo. Subsequently he played a major part in the construction of other railroads and in the development of the Rio Grande valley in Texas.

One chapter is devoted to Sam A. Robertson, a famous Texas contractor who worked for and with Lott in many of his ventures. Many engineers who were in France during World War I will remember Col. Sam Robertson as a picturesque figure on railway construction work for the First Army.

Floods and Flood Control

FLOODS, THEIR HYDROLOGY AND CONTROL—By H. K. Barrows. 432 pp. McGraw-Hill Book Co., New York, Toronto and London. $6.50.

Although primarily written for advanced students, this volume contains a wealth of information concerning floods, their hydrology, and the design of flood control works of direct value to practising engineers. Recognizing that the wide range of conditions to be met in flood-control engineering can be made clear best by reference to actual examples, the author has done well to devote one-third of his treatise to descriptions of existing flood-control projects taken from all parts of the United States. Works on the Mississippi River and on its principal tributaries, which include the Missouri and Tennessee rivers, cover 110 pages.

The trend toward multiple-purpose reservoirs in which power development often is a dominating feature, is well covered. Under the head of Notable Floods, 14 disastrous floods are described, ranging from flashfloods on small streams to major floods in large rivers, thus illustrating the many causative factors introduced by climate, topography and local conditions.

Structural design and cost data derived from existing projects are given in considerable detail, supplemented by excellent illustrations. The merits as well as the limitations inherent in each of eighteen different formulas for estimating probable maximum runoff are discussed at some length. Included are the earliest devised by American engineers, which though only approximate, still have their uses in regions deficient in hydrologic data, as in Central America. Flood loss statistics are presented in tabulated form, and for more general visualization in a logarithmic plot showing average flood losses per square mile for drainage areas ranging from 200 sq mi to 100,000 sq mi. A curve approximating the "usual limit in flood control losses" is of especial interest.

Two chapters on the economics of flood control and the important role played in the United States by federal legislation fittingly complete the treatise. Throughout, the text as well

as the illustrations reveal a high order of care in the selection of material. The author's natural gift for presenting technical matter in lucid and concise terms makes for easy reading to a degree not often found in engineering texts.—Reviewed by GERARD H. MATTHES, Consulting Hydraulic Engineer, New York.

Subsurface Exploration

SUBSURFACE EXPLORATION AND SAMPLING OF SOILS FOR CIVIL ENGINEERING PURPOSES—By M. Juul Hvorslev. 521 pp. Final report of a research project of the American Society of Civil Engineers, sponsored by the Engineering Foundation, Harvard University and the Waterways Experiment Station. Obtainable from the Engineering Foundation, 33 W. 39th St., New York 18, N. Y. Price $4 to members of the Founder Societies, $6 to others.

A vast amount of scattered information on methods and equipment for determining the character and condition of the soil underlying the site of a proposed engineering structure has been assembled in usable form in the large book. Part I covers the general procedure and requirements for underground exploration, including brief descriptions of the many methods from the use of simple sounding rods to seismic and electrical subsurface exploration. Also considered are ground-water observations, various types of soil sampling methods, and soil type. Part II gives details of sampling equipment and methods and outlines proper methods for handling soil samples. Included is a section on sampling in search for oil and minerals. A large bibliography provides much reference material to supplement the text.

Harbor Structures

THE DESIGN, CONSTRUCTION AND MAINTENANCE OF DOCKS, WHARVES AND PIERS—By E. M. Du Plat Taylor. Third Edition, revised and enlarged. 545 pp. Ernest & Spottiswoode, Publishers, London. Price 50 S. Obtainable through Stechert-Hafner, Inc., 31 East 10th St., New York 10.

There are too few books on the design and construction of harbor structures. Of those that have been published, probably the best known is the work of E. M. Du Plat Taylor, which was published originally in 1927. A second edition appeared in 1934, and this latest edition was in preparation when the war put a stop to the work.

Structures built during the war are among the additions, principally the war harbors and the dry docks at Capetown and Sydney. There also is considerable new material on the application of soil mechanics theories to the design of waterfront structures. Thus, the section on the design of dock walls has been entirely rewritten.

Structures described are chiefly in British waters and on the Continent, but a few projects in this country are described.

No one writes about harbor works with more authority than E. M. Du Plat Taylor who for 20 years played a leading part in the design and construction of the great docks serving London. Now in his 72nd year, he states in the foreword that future editions will be in the hands of Cecil Peel who contributed the new chapters on dock wall design.

Fee Contracts

CONTRACTING AS A PROFESSION—By Frederick W. Lord. 85 pp. Richard R. Smith Publisher, Inc., 120 East 39th St., New York 16. $2.

In this little book the author, who until his retirement had served for over 50 years as president of the Lord Electric Co., proposes to put all contracts for construction work on a negotiated fee basis. He would have the negotiated fee apply not only to the general contract but also to the main specialty subcontractors, such as electrical work, plumbing and heating, each of whom would contract separately with the owner to do his part of the work at actual cost plus a negotiated fee. The general contractor, as the owner's representative, would select the subcontractors and negotiate with each as to his fee.

Miscellaneous Notes on Booklets and Reprints

A SUMMARY OF RESEARCH OPERATIONS being carried out by some of the principal military and non-military federal agencies makes up the major part of the 1949 Proceedings of the annual meeting of the Engineering College Research Council (College of Engineering, State University of Iowa, Iowa City). The remainder of the pamphlet is given over to the papers that were presented at the meeting, which was held in Ithaca, N. Y., last June.

FORMULAS AND DATA for computing torsional stresses are given in a 24-page pamphlet, "Torsional Stresses in Structural Beams"—Tinkler, S-57—published by Bethlehem Steel Co., Bethlehem, Pa. Based on a paper by Inge Lyse and B. G. Johnston, "Structural Beams in Torsion," Trans. ASCE, Vol. 101, p. 857, the tabulated torsional properties of beams are exact, but the formulas for stress are inexact, though claimed to be adequate. These data replace constants formerly given in the Bethlehem handbook in the Thirties and then withdrawn when found inaccurate.

HELPFUL SUGGESTIONS FOR BUILDERS are offered in a 156-page booklet, "Home Builders Manual for Land Development," which may be obtained for $2.50 from the National Association of Home Builders, 1028 Connecticut Ave., NW, Washington 6, D.C. It includes such topics as selecting land for small subdivisions, cutting development costs, water, sanitary and road systems, site planning for apartments and small home and tips on landscaping.

New Engineering Book

REFLECTED SUBMERSIBLES—By Parker D. Trask. 707 pp. John Wiley & Sons, New York 16; Chapman & Hall, London. $5.00.

ASTM STANDARDS ON PAINT, VARNISH, LACQUER, AND RELATED PRODUCTS—671 pp. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $4.85.

SUBSTRUCTURE ANALYSIS AND DESIGN—By Paul Anderson. 305 pp. Ronald Press Co., New York. $4.50.

STRENGTH OF MATERIALS—By James I. Bond and Samuel B. Falk. Fifth Edition. 417 pp. McGraw-Hill Book Co., New York, Toronto and London. $4.00.

INFLUENCES ON CONCRETE—By A. Kleinlogel. Translated from the German by F. S. Morgenstern. 251 pp. Frederick Ungar Publishing Co., New York. $7.50.

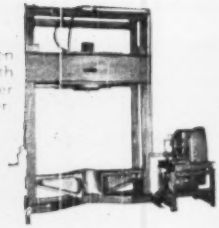
FOREIGN AND ECONOMIC STATISTICS—By Leon H. Karmel. 217 pp. The Brookings Institution, Washington, D. C. $2.50.

HIGHWAYS IN OUR NATIONAL LIFE—A Symposium. Edited by John Labatut & Wheaton J. Lane. 506 pp. Princeton University Press, Princeton, N. J. $7.50.

THE ELEMENTS OF LETTERING—By John Howard Benson and Arthur Gerhard Cross. 137 pp. McGraw-Hill Book Co., New York, Toronto and London. $3.75.

ARCHITECTURAL DRAWING—By Sheridan W. Maguire. 227 pp. McGraw-Hill Book Co., New York, Toronto and London. $7.50.

WARM AIR HEATING AND WINTER AIR CONDITIONING—By John W. Norris. Second Edition. 320 pp. McGraw-Hill Book Co., New York, Toronto and London. $6.00.



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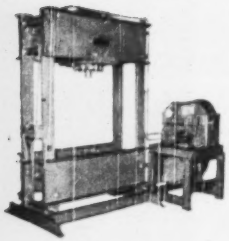

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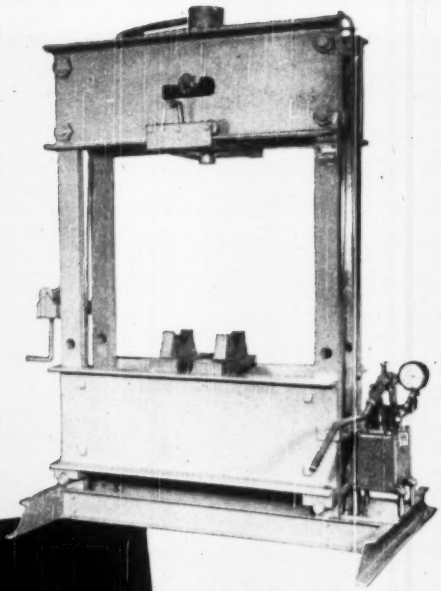

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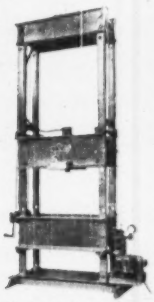

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The standard 100, 150 and 200 Ton Units include many construction and operating features — the cylinder is movable across entire width of upper head member — Two-way Travel Cylinders can be used when necessary to return heavy dies — Sturdy Press Frame permits full pressure to be applied anywhere across 48" width of lower bolster — Bolster adjusts from 12" to 36" — and there are open ends between uprights to accommodate long material extending through.

If specifications on the standard models don't meet your requirements, we'll modify them or build a special press as required.

There are standard model Rodgers Shop Presses in 60, 80, 100, 150, 200, 300 and 400 Ton Capacities!

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New Catalog 313 has descriptions and specifications on the complete line of shop presses.

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READER COMMENT

Prestressed Concrete Methods

Sir: We were astonished to read the letter from Curzon Dobell, vice president, The Preload Corp., New York (ENR March 9, 1950, p. 84) in which the claim is made that The Preload Corp. had a free choice between two methods of prestressing at the time that bids were called for the construction of the Walnut Lane Bridge in Philadelphia. We feel that we must point out that neither the corporation, nor Mr. Dobell, have held licenses for patents which would permit them to use the Freyssinet post tensioning method described in the latter part of his letter and to which he attempts to attribute numerous disadvantages.

L. Coff, consulting engineer in New York, pointed out clearly in his article (ENR Sept. 1, 1949, p. 185) the two jacks most commonly used in tensioning and anchoring. These jacks were referred to by Mr. Coff as the double acting jack used by Freyssinet and Magnel's jack. The Preload Corp. was granted the license to use the Magnel technique, but Mr. Dobell's statement is erroneous when he claims to have been free to use the Freyssinet technique.

R. de Emperyo
Director
Societe Technique pour l'Utilisation de la Precontrainte (S.T.U.P.)
Paris, France

Slab Formulas Too Safe

Sir: The editorial in ENR May 4, p. 21, headed "Wanted: Better Flat Slab Formulas," is a plea for economy that should receive proper attention from speculation and code writers.

In these flat designs, the control on slab thickness is the allowable shear value around the column perimeters; the empirical slab ratios are disregarded. Economy of construction dictates that this thickness be kept constant over the entire slab area, even though a lesser depth of slab is sufficient for concrete stress limitations. Then, it is found that the minimum steel reinforcement limitations, which are always given as a function of the concrete cross-section area, really control most of the reinforcement in the slab. Rather low steel stresses result.

For instance, in the ACI Code, Sect. 707(a), limits the minimum shrinkage and temperature reinforcement as a ratio of the actual concrete section, and the same limitation is given as a minimum reinforcement for the principal reinforcement (Sect. 702(c)4 and 710, for one-way and two-way, supported slabs), with double that amount as negative reinforcement at the outer end of members (Sect. 702(c)2).

The results of a full-scale load test made at the Quebec Houses project (ENR May 4, p. 34) as a check on computed deflections proves how over-conservative are design methods. The design load was 60 psf (includes an allowance of 20 psf for partitions). A full panel was loaded to 100 psf. There being no load on the adjacent panels, the deflection should have been more than that computed.

The actual measured deflection was 0.014 in. with full recovery upon removal of the load, the total load of slab and surcharge being then 178 psf. The computed deflection was many times 0.014 in., and since no deflection formulas are accurate (or reasonable) for reinforced concrete designs, the writer hesitates to give his guesses of that value, except to state that it was approximately equal to the ACI Code limitations under test loads: Under Sect. 202(c), with a superimposed load of 150 psf on the 6½ in. slab, a deflection of 0.362 in. would be considered satisfactory; with a permissible residual deflection 60% of that.

Jacob Feld
Consulting Engineer
New York, N. Y.

Peak-Hour Traffic Problem

Sir: "Park at Your Desk" sounds O.K. but what about traffic congestion when leaving?

In ENR May 11, p. 43, your article on "Park at Your Desk" office building to accommodate 450 autos on 27 levels immediately raises the question of leaving the building when work is done. It seems entirely possible that as many as 400 autos may want to leave at the same time, say around 5 pm. No doubt street traffic is also heavy around this time. Has the street planning been integrated with the building plan so as to provide a smooth uninterrupted flow of traffic to and from the building for as many as 400 cars during rush hours?

Since this is not mentioned in your article it would be interesting to know what plans have been made to make this scheme practicable or whether the street planning has just been left to somebody else. That, we all know, has happened too often before.

Charles Courtney Simpson
Structural Estimator
The Cummins Co.
New York, N. Y.

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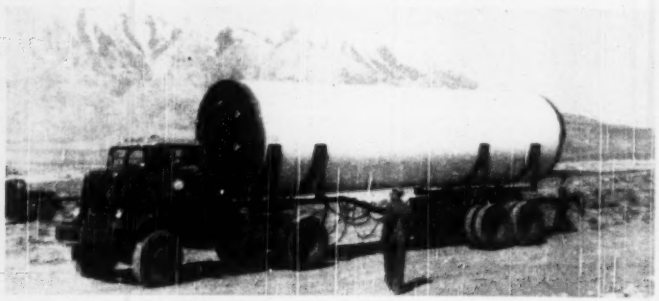
FIELD AND OFFICE



TWO PAIRS of flexible steel bands adjust themselves to 120-deg contact on this 50,000-lb section of 92-in. pipe for a 300-mile trip from Los Angeles to one of three Owens Gorge hydroelectric plants. Some 920 sections are being transported in this way.

Special Trailers Haul Pipe Sections

The pipes consist of a total of some 7,000 tons of steel made up into sections whose diameters range from 92 to 120 in. with plate thicknesses varying from 2 to 2⅜ in.

The Owens Gorge power project of the Los Angeles Department of Water & Power is a 142,500-kw hydroelectric development about 300 miles north of Los Angeles on the eastern side of the Sierra Nevada Mountains. Three power plants now being constructed at very similar sites in the gorge are designed to utilize net effective heads of 548, 771 and 736 ft, respectively. These plants will be served by a combination of tunnels with steel liners and steel penstocks for which pipe sections are now being delivered to the job from fabricating plants in Los Angeles.

Laying a Light-Weight Outfall

The contractor made money and the engineers got a good job when an outfall was recently built from the sewage treatment plant in Ocala, Fla. The low bidder's price on the 5,220-ft gravity pipeline was $12.40 a ft. And the contractor's men on the job figured to do it for $7.15—$4.65 for pipe and $2.50 for laying, but they put it down for considerably less.

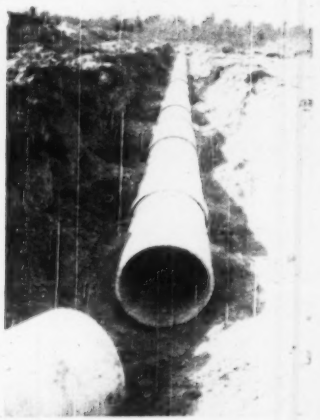
The pipeline was 24-in. asbestos-cement with collar-covered poured joints.

Excavation was by a backhoe, backfill by a truck-mounted clamshell.

One foreman and five laborers graded the trench and placed and aligned the pipe. Another crew of the same size placed friction tape over butted ends of pipe, centered collars over butts, placed calcined gypsum mixture on both sides of the collar and poured a jointing compound under the collars.

Leaks in the friction tape were sealed up on the inside with moist clay. When leaks appeared, the adjacent unjointed pipe was moved and a laborer crawled to the leak and plastered it up. The joint was then sealed and the pipe replaced. This proved to be cheaper and better than breaking the collar and replacing the friction tape.

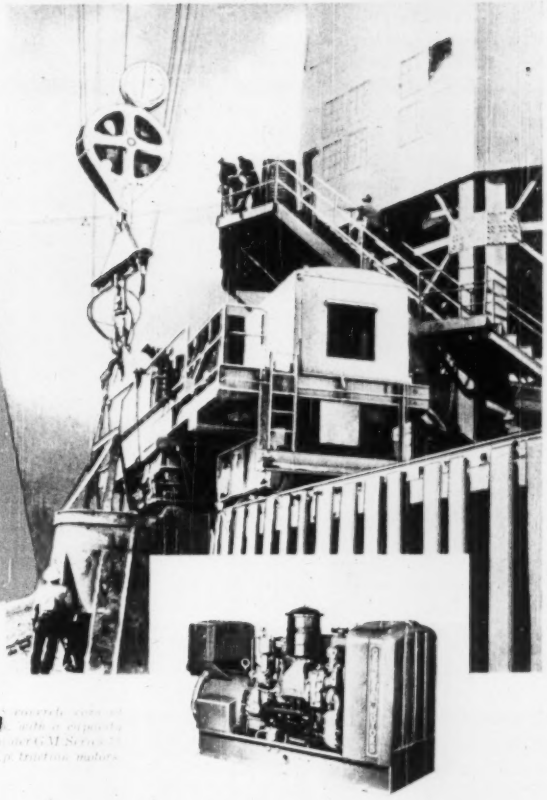
The project is under the supervision of Russel and Axon, consulting engineers of Daytona Beach. Construction is being done by E. H. McGraw Co. of Hartford, Conn.



ASBESTOS-CEMENT PIPE (24-in.) stretches from the Ocala, Fla. sewage plant to lagoons where the highly purified effluent leaches into the soil.

A CONCRETE Case for

GM DIESEL POWER



Built by Washington Iron Works, Seattle, the concrete cars at Hungry Horse Dam have a top speed of 5 mph with a capacity payload of 24 tons. Each car is equipped with a 2-engine set GM Series 71 Diesel to operate the two electric generators which in turn power the traction motors.

THREE specially built Diesel-electric concrete cars, used by the General-Shea-Morrison group at Hungry Horse Dam, are a vital link in the carefully planned facilities with which the contractor expects to place a million cubic yards of concrete this year.

Carrying two 8-yard side dump hoppers, the cars move concrete from the mixing plant to points directly under cableways where they discharge into buckets. This eliminates time lost moving buckets on and off cars—saves travelling time of the 500-ton cableway tail towers—increases cableway capacity by at least 25%.

It's a job that calls for smooth coordination. There can be no failure or falter. Shutdowns would be costly. So General Motors Diesel generator sets were a natural choice to power these cars.

Because they are 2-cycle, with power at every downstroke, GM Series 71 engines are compact, smoother in operation and quicker starting. They are designed for easier servicing; have no high pressure fuel lines and offer maximum interchangeability of parts.

Add to these advantages their higher power-per-pound, their economy and rugged durability, and you'll see why contractors everywhere are turning to GM Diesels. Get the full story from your local equipment dealer or write direct to us.

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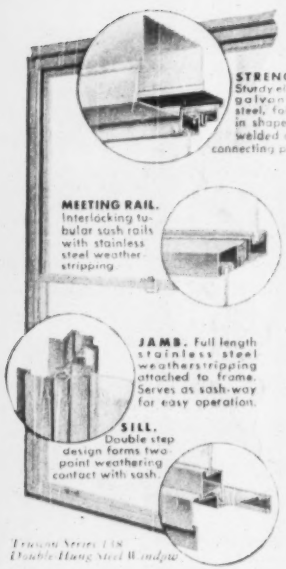
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SILL. Double step design forms two-point weathering contact with sash.

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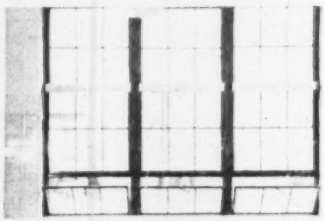
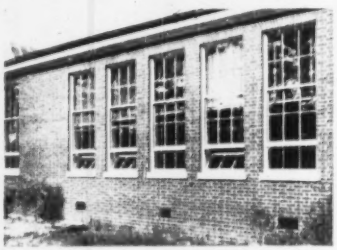
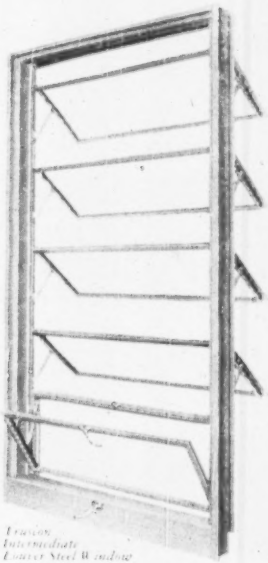


The generous use of nature's free sunlight and fresh air is possible with these durable Truscon Steel Windows.



Truscon Series 138 Double-Hung Steel Windows in Southern Pines School, Southern Pines, N. C. Easton Construction Company, Charlotte, N. C., Contractors. William Henry Deitrick, Inc., Architects, Raleigh, N. C.



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The building world needed windows so strong, so efficient, so moderately priced that they would be adaptable to a wide range of construction requirements. Truscon applied all its exceptional facilities to the problem—great experience in windows, expert engineering talent, tremendous manufacturing facilities. Result: the Truscon Series 138 Double-Hung Steel Window and the Truscon Intermediate Louver Window—now widely used in residential, school, institutional and commercial structures! Due to the wide range of standard types and sizes offered, and the availability of integrally built sill ventilators, the designer can create a distinctive window arrangement exactly to meet any particular requirements. Modular standards employed throughout. Write for illustrated literature giving complete details.

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DEVELOPMENTS ABROAD

MEANDERING RIVER CORRECTED—Engineering work similar to the cutoffs along the lower Mississippi has just been completed on the main Papaloapan River, heart of Mexico's $143,000,000—power and irrigation project. Six cutoffs have been made to aid transportation and flood control. Highways and airfields are being built in the area and the port of Alvarado is being dredged. Contracts have been let for the first work on the President Aleman Dam which will store about 40,000,000 acre feet. Eventually a 4-dam system is expected to produce 500,000 kw. Incidentally, the photograph shows an excellent example of meandering, the word derived from the Maeander River in ancient Phrygia, Asia Minor.—Mexicana Areofoto.

BRICKS FROM RUBBLE—Hundreds of thousands of bricks, processed from rubble, wait to be sent out from a new plant at Frankfort-on-Main, Germany. Molded in different sizes, the bricks are used in reconstruction of the war-damaged city. The first step in the manufacture is to free the rubble from the wood, iron, glass, and marble. The old bricks are then ground up and processed. The plant works day and night and employs 950 men. In a month it turns 45,000 tons of rubble into 3,000,000 bricks. In the last three months 6,500,000 of the bricks went into the construction of a U. S. High Commission community which is being built in that city. —Wide World photo.

Foreign Briefs

Power, irrigation, drainage—A $5,000,000 project to build electric, irrigation, and drainage stations in Nag Hamadi, sugar cane producing area of Southern Egypt, has been entrusted to the French firm Comptoir des Entreprises Electriques, in association with the German Siemens concern. Osman Moharram Pasha, Minister of Public Works, said the offers of these two companies was the most advantageous to Egypt. The project includes the building of a central electric power house with Diesel engines, the construction of irrigation pumps near Nag Hamadi, a pumping station, and electric lines to feed the irrigation and drainage stations.

New Zealand paper mill—The Dominion of New Zealand is preparing plans for a pulp and paper mill at Marupara in the Bay of Plenty zone to produce 400 tons of newsprint daily, 50 tons of surplus pulp and 300,000 bd. ft of sawn timber. The New Zealand Forest Products Ltd. also is preparing plans for a $3,000,000 chemical wood pulp mill at Tokoroa to have a capacity of 25,000 tons of pulp annually.

Italy's first prestressed bridge—The first Italian bridge made of prestressed concrete has just been completed at Persiceto to carry the Bologna-San Giovanni road over the Samoggia River, replacing a metal bridge destroyed in the war. The bridge has ten cross-beams in pre-compressed reinforced concrete resting on piles on opposite banks of the stream. It has a span of 91 ft, and a width of 33 ft. The new method of construction represents a saving of 22 percent in concrete and of 60 percent in steel.

Ducts in concrete—The Freyssinet organization in Paris recently has been carrying out some experiments with an American-invented rubber tubing which can be used to form ducts in concrete through which prestressing cables are subsequently threaded and tensioned. This tubing is fitted at one end with an ordinary auto tire valve and normally is inflated to a pressure of about 40 psi. The tube, which has an external diameter of ¾ in. deflated is suitable for use with 12 to 18-wire Freyssinet-type cables and anchorages. In one experiment, a 13-ton beam containing 130 ft of 12 and 18 wire cables was cast using these tubes. It was found that with wiring at about 4-ft intervals, the inflated tubes were rigid enough to hold the curvature or straightness required of them. A few hours after concreting the beam, the tubes were deflated, lengthened, untwisted and easily withdrawn.

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EASY TO READ MARKINGS THAT ARE DURABLE

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An Engineer's Pet is the Peerless because: Instantaneous Readings — permanent jet black markings that stand out against a pearlized non-glare chrome white background that will not crack, chip or peel.

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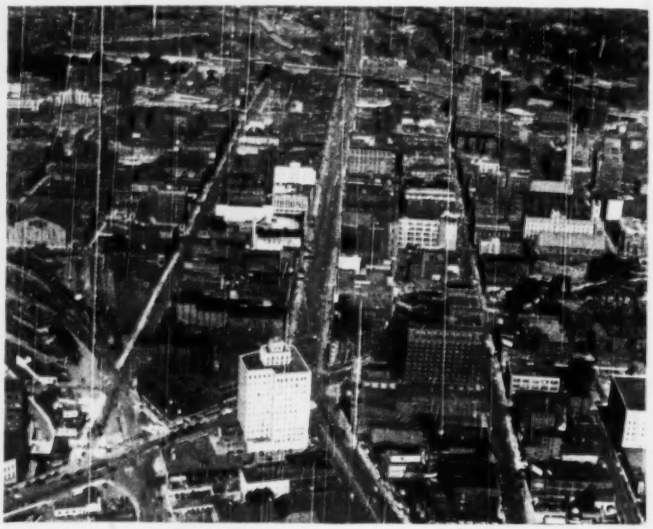
MUNICIPAL AFFAIRS



THE HEART OF SYRACUSE—The business section of Syracuse with Salina Street (its name reminiscent of the salty origin of the city) running north and south. The light-colored building in the foreground is the Hotel Syracuse. Just to the right of it is the Onondaga Hotel. Crossing North Salina Street in the background is the elevated structure of the main line of the N. Y. Central R.R. For many years the railroad tracks ran on Washington Street through the heart of the city. The tracks were relocated and raised, and a new station built. In the left foreground is the Delaware, Lackawanna & Western Railroad. In the right foreground is the site of the new war memorial auditorium.

Syracuse war memorial top city project

With a $5,500,000 municipal war memorial under way in the heart of the downtown business district, Syracuse, N. Y., builders are pushing a heavy construction program to keep pace with their fast growing, bustling city.

The 9,000-person-capacity auditorium leads a building program that includes hundreds of housing projects, a VA hospital, and numerous factory and store structures for one of the busiest industrial centers in the United States.

In addition to its seating capacity, the auditorium will provide 90,000 sq ft of exhibit space, and can be adapted, among other things, to become an ice rink with seating capacity of 6,500 spectators.

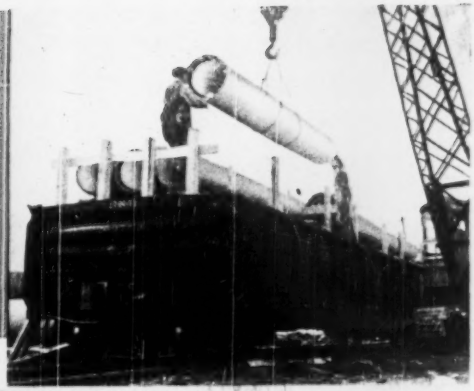
Situated in the center of New York State, Syracuse now has a population of more than 225,000, having doubled in the last forty years. Its early rapid growth was due to the discovery of the salt springs there and the development of the Erie Canal, but its later development is the result of its central location in the Empire State and the fact that it is the hub of railroad and highway transportation and has become one of the leading industrial centers in the East.

The salt business, which gave Syracuse its start, is no longer in existence there, but in its place has grown a large group of modern factories employing 52,000 workers, making diversified products amounting to $200,000,000 worth annually.

Syracuse is a leading city in the manufacture of air conditioning machinery, typewriters, air cooled engines, tool steel, automobile gears, differentials and transmissions, cans and can making machinery, roller bearings, soda ash and by-products, fine wax candles, agricultural implements, high class chinaware, mincemeat, shoes, electrical appliances and hardware, washing machines, clothes pressing machines, foundry and machine shop products, electronic equipment, and many other products.

Onondaga County is one of only 33 out of the more than 3,000 counties in the United States where every major classification of industry as defined by the U. S. Department of Commerce is represented.

16" and UP



If your requirements call for transmission or distribution mains of 16" diameter or larger, Lock Joint Pipe Company can provide high quality concrete pressure pipe in all standard diameters and some intermediate sizes. Starting at a minimum of 16", Lock Joint Concrete Pressure Pipe is produced in 32 different diameters, and its four distinct types of structural design cover every working condition common to American water works practice.

Not only does Lock Joint Concrete Pressure Pipe qualify fully under A.W.W.A. specifications, but it alone embodies, in a conventionally designed pipe, proved to meet competition, all the following time-tested characteristics listed at right.

- PERMANENT HIGH CARRYING CAPACITY
- PROOF AGAINST TUBERCULATION, CORROSION AND ELECTROLYTIC DAMAGE
- IMMUNITY TO RUPTURE OR BLOW-OUT
- SAFETY UNDER EXTREME EXTERNAL LOADS
- EVERY JOINT FLEXIBLE AND WATERTIGHT
- EASILY TAPPED
- SPECIALS TO MEET INDIVIDUAL SPECIFICATIONS
- USEFUL LIFE CONSERVATIVELY ESTIMATED AT 100 YEARS
- MINIMUM MAINTENANCE AND REPAIR COSTS

Why does your proposed line so large or small it will pay you to use Lock Joint Concrete Pressure Pipe, the pipe of proved durability, economy and dependability.

SCOPE OF SERVICES: Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe, for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

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Reinforced Concrete
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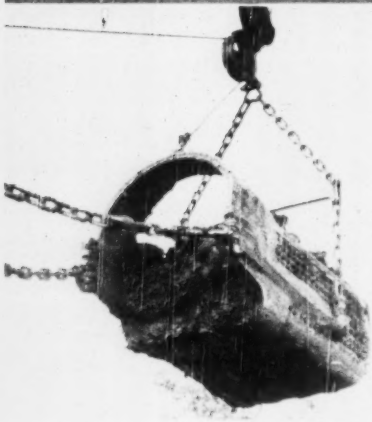
IT'S EASY TO INCREASE PROFITS

ON EVERY JOB WITH

HENDRIX DRAGLINE BUCKETS



When you use a Hendrix Dragline Bucket you never have to worry about output in any kind of digging . . . hard or soft! Those parts of a bucket which take the brunt of abuse and normally wear the most are of cast manganese steel insuring long-life and trouble-free operation.

If you're up against a difficult digging job, you need a HENDRIX . . . built to take it and built to give you low-cost, maintenance-free performance day in and day out!

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Court actions may delay Dallas improvements

Dallas, Tex., and its housing authority have filed a suit in the local district court to determine the legality of the federal aid program in Texas. This must be determined by the Texas Supreme Court before the federal government will grant any more loans for the slum-clearance program in the state.

The sale of the first $6,000,000 worth of bonds of the $22,500,000 road bond issue voted by Dallas County last January has been cancelled because of two lawsuits filed by Horace G. Edwards in the district court. He is seeking to obtain a permanent injunction against the issuance of the road bonds because it is planned to use $5,679,000 of the issue to finance street improvement within the city of Dallas.

Cancellation of the bond sale will cause the county to lose the low interest rate of 1.74 percent and it will have to wait till the lawsuits are settled before it can readvertise for bids on the bonds and start work on the $22,500,000 road improvement program.

Municipal Briefs

Albuquerque improvements—Voters of Albuquerque, N. M., have approved eight bond issues for improvement projects totaling $5,675,000. More than $5,000,000 will go for water and sewer extensions. Work will start about June.

Richmond street face-lifting—A $278,000 face-lifting job on Broad Street, Richmond, Va., between 12th and Laurel Sts. for the 1950-51 fiscal year is in the city planning commission's recommended capital improvement program. The work involves resurfacing, removal of tracks and center poles, and new street and traffic lights.

Budget reduction—An order to cut its budget by at least 10% for the 1950-51 fiscal year has brought a protest from the Los Angeles city inspector's department, which claims public and private builders would lose millions annually if its staff is reduced. City Inspector Ted Niederhoffer told the city council that "damages and costs resulting from poor construction through lack of inspection will run into millions." Private contractors, he said, would have to increase bids if inspectors were not available at all times. City ordinances require the presence of an inspector during the construction of public works.

The Ninth of a Series in the interest of more efficient use of steel . . . a vital American resource

LACLEDE MULTI-RIB REINFORCING BARS

NOW . . . Available by Number in Standard Sizes of New A.S.T.M. Serial Designation A305-49 Table I

Thanks to A. S. T. M. specification A305-49, designers now have a more efficient bar for concrete reinforcement . . . one that provides **increased anchorage** which when properly used will give appreciable **savings in steel and concrete.** Advanced design Laclede Multi-Rib Reinforcing Bars exceed the A305-49 specification. They are available in uniform round sections in all standard sizes and can now be ordered by number.

TABLE I A.S.T.M. SERIAL DESIGNATION A305-49

Dimensional Requirements for Deformed Steel Bars for Concrete Reinforcement

		NOMINAL DIMENSIONS ROUND SECTIONS			REQUIREMENTS OF DEFORMATIONS		
Bar No.*	Unit Wt. Lbs. Ft.	Diameter-Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing Inches	Min. Height Inches	Max. Gap. Inches ‡
3	0.376	.375	0.11	1.178	0.262	0.015	0.143
4	0.668	.500	0.20	1.571	0.350	0.020	0.191
5	1.043	.625	0.31	1.963	0.437	0.028	0.239
6	1.502	.750	0.44	2.356	0.525	0.038	0.286
7	2.044	.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9*	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10*	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11*	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*These sections have the same weight and area as bars formerly known as 1" Sq., 1⅛" Sq. and 1¼" Sq.

‡Chord of 12½% of Nom. Perimeter.

"Bar numbers are based on numbers of ⅛" included in the nominal diameter of the bar section.

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Producers of Construction Steel

LACLEDE STEEL COMPANY

St. Louis, Mo.

Stang WELLPOINT SYSTEM

For KNOW-HOW • ENGINEERING • SUPERVISION • EQUIPMENT • to keep jobs DRY

The Stang System has proved its efficiency and economy on both large and small jobs all over the United States. Stang engineering and supervision in planning, installation and operation insures a DRY JOB at all times.

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This salt-type wood preservative makes lumber and timber unpalatable to termites . . . kills decay-causing fungi . . . gives a high degree of fire-retardance. Copperized CZC does all this while leaving wood clean, paintable, odorless and safe to handle. Sound reasons why you should specify pressure treatment with Du Pont Copperized CZC.

Full technical details on Copperized CZC available for the asking. Write: E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Delaware.

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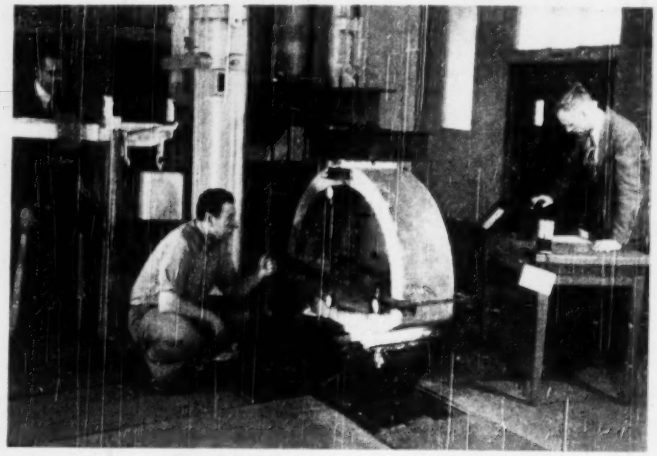


TESTS ON CULVERT PIPE—Civil engineering students at Carnegie Tech study behavior of a basket-handle form of culvert. Left to right, Prof. J. W. Graham, Jr., who supervised the structural study, and A. K. Oechsle and N. E. Coates, seniors. Parallel hydraulic studies were made by T. E. Stelson under the direction of Prof. E. F. Mavis.

J. K. Finch retires as dean

James K. Finch, long a national figure in engineering education, is retiring as dean of the school of engineering at Columbia University, to be succeeded by John R. Dunning, professor of physics and associate director of the university's new Nevis cyclotron at Irvington-on-Hudson, N. Y., who is a pioneer in atomic research.

Dean Finch, who retires in accordance with Columbia's recently adopted rule that 65 is the age limit for all administrative officers, will resume the chair as Renwick professor of civil engineering, the post he formerly held. He was graduated at Columbia in 1909 and has been a member of the engineering school staff since 1911.

Under Dean Finch's direction in the last year, the school and its alumni have launched a broad development plan, the first phase of which is the prospective acquisition of a new building on Riverside Drive near the campus. This is the first step in the creation of a new Engineering Center, subsequent planning for which is now to be directed by Dr. Dunning.

Jobs for 1950 graduates

It will be easier for 1950 engineering graduates to get jobs this year than was expected, according to the annual college placement survey by the Northwestern National Life Insurance Co., Minneapolis, Minn.

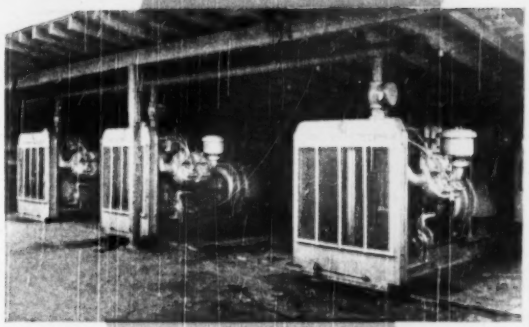
Starting salaries will be as high or higher than last year, survey reports from 47 engineering schools showed. Of the schools surveyed, 21 reported that 40 to 100 percent of this year's graduates will have jobs by autumn; the company reported. Another 10 schools estimated that 75 to 90 percent of their current crop of graduating engineers will be placed by that time.

Employment demand equal to or better than in 1949 was reported by 20 schools. Nine noted that jobs offers are slightly more last year. A

(Continued on page 58)

GARDNER-DENVER *Speeds* TUNNEL CONSTRUCTION

at the portal . . .

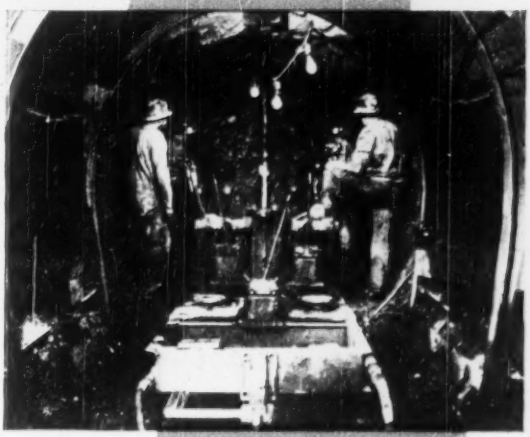


700 cubic foot WBJ Two-Stage Compressors are available with electric motor, diesel or gasoline engine drive.

Complete truck-mounted jumbos are equipped with one, two or three drill booms and a roof jack unit. Separate hydraulic boom and roof jack units are available in various lengths for your custom-built jumbo.

Ready to hook up and go — "packaged" WBJ Compressors require no special foundation — no water piping — no external cooling devices. That's why you get air power "on tap" days ahead of schedule — with a smaller investment in the compressor house. And remember, smooth-running WBJ Compressors — with balanced construction and self-contained cooling system — assure dependable, low-cost air to speed every foot of the bore.

at the face . . .



Save drilling time every round — choose versatile Gardner-Denver Hydraulic Drill Jumbos with "*creep-free*" booms. Faster on the setup — faster from hole to hole — faster tearing down. Handle up to 10-foot steel changes — give you low-cost drilling — faster, properly drilled rounds.

For complete information, write Gardner-Denver Company.

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Split Half a Second into Sixteen Parts . . . *and you get a sensational improvement in blasting methods!*

Here's a picture that shows WHY the ROCKMASTER Blasting System pays off! Notice the rock in motion. And yet the explosive gases are held within the burden. No spectacular "spouts" of gas going to waste. Result: Greater explosives efficiency, better fragmentation, less vibration, greater safety.

In a ROCKMASTER blast, holes are electrically fired at controlled split-second intervals. The timing is in each electric blasting cap. The ROCKMASTER "16" series offers you a choice of sixteen millisecond delay detonators, all starting together, all firing at timed intervals in a little over half a second!

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Your job may call for two, three or all sixteen ROCKMASTER detonators. We help you select them to fit your job. Drill pattern and explosives are based on what you want to accomplish. Many times, this means important savings in drilling and dynamite.

Write for your copy of the booklet on the ROCKMASTER "16" Blasting System. It includes diagrams for loading in quarrying, stripping, mining, construction.

ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

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decrease in demand for new graduates of 25 to 50 percent was reported by 18 schools, but this was offset in many of the schools by corresponding declines in the number of graduates.

Boston reports favorable—About half of this year's engineering school graduates in the Boston, Mass., area are assured of jobs, according to figures recently released by the institutions. The remaining 50 percent will have found jobs by October or November, it is claimed.

"The situation may not look bright when contrasted with the years immediately following the war when industry was desperate for engineers and would buy them sight unseen," said Nathaniel M. Sage, director of the division of industrial cooperation and placement officer at Massachusetts Institute of Technology. "But when you compare this year with the late 30's, you will find that, as of this date, we are better off than in any year except 1939."

In Boston the finding is that any qualified engineering graduate who is really serious about going out and getting a job, will be placed.

On May 22, at M.I.T., there had been placed 47 percent of the bachelors; 56 percent of the masters, 100 percent with professional degrees, and 65 percent of those with doctors' degrees. In addition, several students had received offers and were trying to make up their minds. The entire graduating group numbered 1286.

Two-thirds of Cornell University's 1950 engineer graduates are already employed.

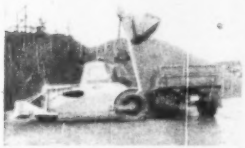
Educational Notes

Engineering council—An engineering council to coordinate activities of student chapters of four of the engineering societies—the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Chemical Engineers, and the American Institute of Electrical Engineers—has been formed at the University of Delaware, Newark, Del. The council will foster one joint professional meeting each semester, an annual engineers' ball, an open house, and a student technical publication.

Civil engineering at Laval—Creation of a complete school of civil engineering, to start next fall, has been announced at Laval University, Quebec.

Prof. Frank M. Ellis has been named acting dean of the William Raven School of Engineering of Youngstown, Ohio, College, succeeding the late Dean Louis A. Deesz.

Additional height of track as shown here makes the Duo-Way a versatile profit-maker.



Scoop lifts to a height of 14 ft. and track tilt of 10° makes loading easy.

Big 84-inch dozer blade with 8000 lbs. down pressure levels land on this job. Scoop at other end can be filled for ballast.

SCOOP AT ONE END . . . . . DOZER AT THE OTHER

Power-packed, all hydraulic controlled, the Wagnermobile Duo-Way Scoop cuts operating costs. Saves in both labor and equipment. Four big operations in one . . . loader, dozer, truck and tractor.

Big 84-inch dozer blade dozes out a bank . . . 1 cubic yard scoop at the other end scoops up dirt, lifts it and loads it. All by one machine — Wagnermobile Duo-Way Scoop.

Wagnermobile Special Features:

- Driver in side saddle position has all around vision . . . perfect control.
- Planetary drive . . . rugged "extra" power.
- Improved hydraulic controlled track and dozer.
- Special tilt control track tilts 10° back, 10° forward.
- Top section folds down to 9 ft. 6 in. for low road clearance.
- Highway speeds up to 20 mph.
- 4 speeds forward, 4 speeds reverse.
- Complete assortment of attachments for versatility.
- Wagnermobile Duo-Way Scoop is designed for top performance. Job tested for more profit on every job.

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MEN AND JOBS

Charles R. Foster has been appointed chief of the flexible pavement branch, Soils Division, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss., succeeding **W. K. Boyd** who recently went to Juneau, Alaska, with the Bureau of Public Roads. Mr. Foster has been with the Corps of Engineers since 1936, when he was employed in the soils laboratory of the Memphis District. He transferred to the Little Rock District in 1937 and to the Waterways Experiment Station in 1943. Since 1946, he has been assistant chief of the Flexible Pavement Branch. He served as a Corps of Engineers officer in Germany during the 1948 engagement of Berlin airfields at the time of the "Air Lift".

P. R. Sandwell, consulting engineer, has announced the formation of Sandwell and Company, Limited, with offices at 750 Granville Street, in Vancouver, B. C. The company will serve as engineering consultants for industrial undertakings, especially pulp and paper plants.

Fred Carmichael, engineer-director of the N. J. Bituminous Concrete Association for the last two years, has been named engineer of the Montana State Highway Department. He is a civil engineer graduate of the University of Washington, 1910.

Mrs. Doris Sullivan of La Jolla, Calif., long a municipal consultant, has been appointed city manager of National City, Calif. She is believed to be the only woman city manager. She has outlined a program of tidelands development to create industrial land along San Diego Bay, and annexation of unincorporated areas adjacent to the city. She was graduated from the University of California, and has done graduate work in public administration.

The Southern California Metropolitan Water District has announced the appointment of Robert B. Diemer, left, as assistant general manager and chief engineer, and Robert M. Peabody, right, to succeed retiring chief electrical engineer James M. Gaylor, center. Diemer was promoted from chief operation and maintenance engineer of the Colorado River Aqueduct system. He will have charge of five pumping plants and the 237-mi transmission system supplying power for the pumps from Hoover Dam.

Environmental sanitation activities of the Florida State Board of Health are directed by David B. Lee, chief sanitary engineer. Harvard-trained men—John Miller (l) and John Wakefield head up the water and sewage sections.

George T. McClean, Astoria, Ore., city engineer, is retiring after 20 years. He plans to engage in private practice as a consulting engineer at Astoria and Portland. For many years he has been engineer for the port of Astoria.

D. D. Godfrey, Revelstoke, B. C., has been named provincial public works engineer for the Prince George district. He went to Revelstoke from Buenos Aires.

Charles Hawkins, city and county planning director of Nashville, Tenn., has been appointed by the Nashville Housing Authority to be redevelopment director of the multi-million dollar Capitol Hill project in that city. A graduate of the school of engineering, Vanderbilt University, Nashville, he has been director of both city and county planning commissions for the last decade. During his leave of absence from his regular post to direct the Capitol Hill project, **W. A. Pitts**, county planning engineer, will take his place.

Loyd C. Huffman, superintendent of the Dayton, Ohio, sewage treatment division since 1946, will succeed **W. W. Morehouse** as director of the Dayton city water works division. Huffman has been in the employ of the city since 1928, and served as acting superintendent of the city sewage treatment division for several years. Morehouse retired recently after directing the water division for 23 years.

John L. Savage, famous Reclamation engineer, who has designed some of the largest dams and multiple-use water conservation projects all around the globe, has been nominated by Commissioner Michael W. Straus for a place of honor in Reclamation's Hall of Fame.

Lionel Hunter, Assistant Commissioner of Works, Ottawa, Ont., has been named by Board of Control to be acting Commissioner of Works.

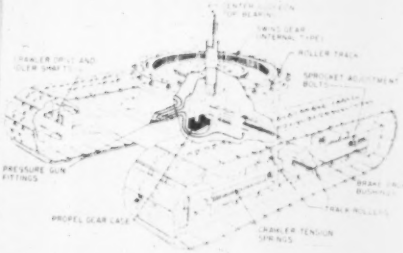
J. H. Irvine, designing engineering assistant in the Works Department, Ottawa, Ont., is to be acting assistant Commissioner of Works.

(Continued on page 62)

Best-Telling Book

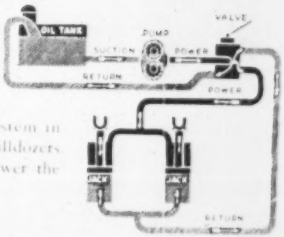
CONTENTS:
WHAT LUBRICANTS FOR WHAT APPLICATIONS —AND WHY

YOUR TYPE of construction equipment—engines included—is plainly, soundly covered in this book. You'll be able to judge for yourself which types of lubricant best suit various machines and conditions. You can make your own point-by-point check-up on the complete line of Cities Service lubricants—engineered in types and grades sure to be more than a match for fierce loads, weather and terrain. The performance records prove how sharply maintenance costs go down . . . how steadily grueling schedules are met . . . with Cities Service lubricants on the job. Call the nearest Cities Service office for competent aid, or write us direct.



"FIG. 23

Shows internal-type open gears of swing rack and one method of lubricating trunion and other shaft bearings . . . The propel gears are enclosed and oil lubricated. The crawler track and other parts lubricated through pressure gun fittings require grease. See lubrication chart for proper type and grade."



"FIG. 33

Hydraulic system in use on some bulldozers to raise or lower the blade."

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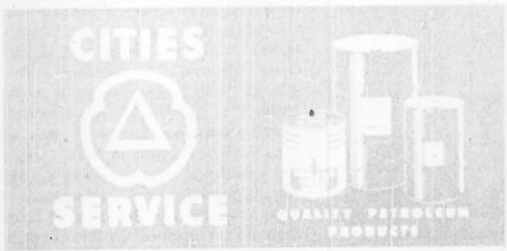
Compressor Oils — Hydraulic Oils
Multi-Purpose
GEAR OILS
HEAVY-DUTY MOTOR OILS



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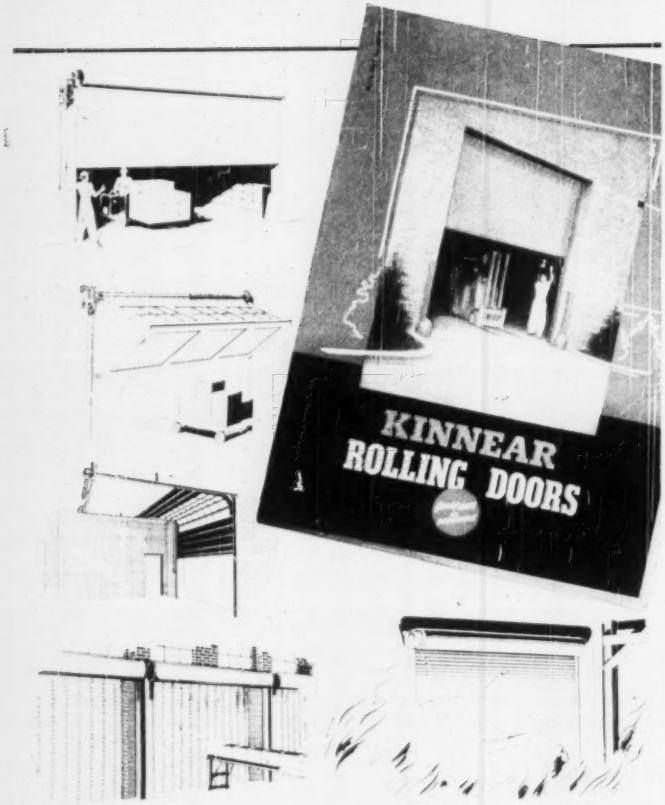
New, Complete DOOR DATA



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You'll have full information on cost-cutting doors for every need in this complete new Kinnear catalog. For example, it presents:

Kinnear Rolling Doors. The famous interlocking steel-slat doors—*originated by Kinnear*—close smoothly, easily upward, coiling out of the way overhead. They save door and wall space. All metal construction assures extra years of low-cost service, protection against fire, storm, intrusion, and accidental damage. Available with Kinnear motor operators and push-button control.

Kinnear Rolling Fire Doors. The famous "Ak-bar" Fire Door, similar to doors above, but featuring automatic closure in case of fire, with safety for building occupants.

Kinnear Rol-TOP Doors. Section-type upward-acting doors, of either wood or all metal construction. Paneled for glass as desired.

Kinnear Bi-Fold Doors. Two-section doors of wood or metal that "jackknife" to overhead position. Paneled for glass as desired.

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KINNEAR
ROLLING DOORS

Rear Admiral Wm. M. Angas (CEC) U.S.N., director of the Atlantic division, Bureau of Yards and Docks, has retired after a Navy career of 32 years, and has become chairman of the civil engineering department of Princeton University. A graduate of M. I. T., 1917, Admiral Angas is known to thousands of Seabees as the Officer in Charge, Third Naval Construction Brigade and Head of the 7th Fleet Construction Forces who supervised the construction of many bases in the Pacific, and the 7th Fleet headquarters in Manila the Philippines.

N. A. Staples was recently made assistant chief engineer in charge of maintenance in the Pennsylvania Department of Highways. He studied engineering at Pennsylvania State College, served as a lieutenant with the 7th U. S. Engineers in France during the first world war, and joined the department in 1919. He has had experience in all branches of highway construction and maintenance in many parts of the state. Latterly he has been district engineer at Harrisburg.

The Egleston Medal, awarded annually by the alumni association of Columbia University's School of Engineering for distinguished service in engineering, was presented this year to **Edmund A. Prentis**, of the New York firm of Spencer, White and Prentis. He was graduated from the school in 1906, and has been active in many underground construction projects, including subway construction in New York City. He has been responsible for improvements in the techniques of hydraulic jacking as well as for new applications of scientific principles to the solution of other practical problems.

Fred G. Schlemmer, manager of operations of the Hanford plutonium production center at Richland, Wash., for the U. S. Atomic Energy Commission, has resigned to enter the construction industry, in New York. A civil engineer, he was with TVA for 13 years until 1946, became a consultant to AEC in 1947, and a year later went to Hanford as manager.

Herbert M. Bates, an employee of the Tennessee Department of Highways & Public Works since October, 1919, has been appointed division engineer at Nashville. He succeeds the late Robert J. Love. Bates attended the Columbia Military Academy. He has been continuously employed by the state highway department for more than 30 years and since July, 1935, has served as division maintenance engineer with headquarters in Nashville.

The North Carolina State Highway Commission has made these changes in personnel: **Berrien W. Davis**, state maintenance engineer, will replace **S. C. Austin** as state equipment engineer. Mr. Austin resigned to become assistant executive secretary of the Carolina branch of AGC. **Zeb V. Stewart**, division engineer at Asheville, will succeed **John C. Walker**, division engineer at Wilkesboro. Mr. Walker resigned to become city engineer of Asheville. **W. M. Corkill**, assistant division engineer at Asheville succeeds Mr. Stewart, and **J. T. Knight** succeeds Mr. Corkill.

Levi Wilson has been named city engineer at Peru, Ind., succeeding the late John C. Horan.

Neil W. Bond is with Henkels O. McCoy, Philadelphia contractors, as projects manager. He had been resident engineer for the Corps of Engineers, Baltimore district, having served on the Wilkes-Barre, Pa., Veterans Administration Hospital project since March, 1948.

This 2½ cu. yd. Sauerman Power Scraper cuts deeply into hill of gravel and moves about 85 cu. yd. of material an hour to crusher. The scraper tail-block is attached to a movable bridle frame located on the brow of the hill.

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Great Flexibility

Sauerman machine can reach across a stream, pond, pit or stockpile or to top of hill and move material rapidly from any point within its cable radius. The radius can be extended as far as 1,000 ft. or more.

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Completely illustrated book describing many typical installations sent on request. Our Engineering Department will gladly advise on your problems.

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EASY—WHEN YOU KNOW HOW

With a Sauerman Power Scraper you can simplify many excavating and stockpiling jobs that require moving materials short distances. A Sauerman machine digs a heaping load, hauls this load to any desired point within its operating radius, dumps automatically, then returns at high speed to dig another load.

Operation and Upkeep Are Simple . . .

The operator of a Sauerman Scraper has control of everything at his finger-tips. Any workman is easily trained for the job. Power consumption is small. Installation and upkeep costs are surprisingly low.

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ELECTIONS AND ACTIVITIES

Daniel P. McGillicuddy of Roxbury has been appointed executive secretary of the Massachusetts State Planning Board. The board is chiefly an advisory agency, but city and town planning boards and zoning boards refer to the state board for information on procedure.

Brig. Gen. Hugo C. Wahle, USA retired, Washington, D. C. engineer of the U. S. Corps of Engineers was recently elected national lieutenant commander of the Amphibian Engineers' Association. Other officers are A. G. Stonington, national secretary and Maj. Gen. Daniel Noce, chief of staff, Army Forces in Command, honorary lieutenants.

James D. Hendrie was elected president of the newly organized Onondaga County Chapter of the New York Good Roads Association. William H. Kearney, vice president, and E. Cecil Hurlin, secretary-treasurer.

Officers of the Alabama Chapter, American Public Works Association are: Morris Ford, president; O. J. Scimeca, vice president; and J. N. Dunn, secretary-treasurer.

H. P. Sedwick has been elected president of the Western Society of Engineers, Chicago. Other officers: Donald N. Sayre, first vice president, Orval W. Eshbach, second vice president, John D. Sullivan Jr., treasurer. Trustees: H. E. Cramer and A. W. Hobson.

Carey H. Brown, general superintendent of engineering and services at Kodak Park, Rochester, N. Y., has been elected president of the Rochester Engineering Society. He succeeds Stanley C. Segur, who becomes a director for three years. Other officers are: First vice president, Alan H. Carydec; second vice president, Howard A. Brown; treasurer, Norman H. Davidson, and directors for three years, Howard Harding and Ray H. Manson. Directors held over are Harvey J. Kiimly, E. Blakeney Gleason, John W. Merrison, J. Howard Cather, Earl C. Kirker and Alexander Russell.

Dexter D. Caffin, Windsor Locks, Conn., has been elected president of the New England Interstate Water Pollution Control Commission. Officers of the control commissions of New York, New Jersey, Connecticut, Massachusetts and Rhode Island are considering steps necessary to accelerate the attack on pollution in coastal and interstate waters. Surveys of the situation have been made and studies were made also at Rhode Island State College, Kingston and Wesleyan University in Middletown, Conn. One of the surveys took up the problem of water pollution in the New England and New York textile industry.

The civil engineers of the faculty and alumni of Rensselaer Polytechnic Institute, Troy, N. Y. joined with other engineers in that district to honor Prof. Warner C. Taylor of Union College at a testimonial dinner recently at a meeting of the Mohawk Section, American Society of Civil Engineers. Professor Taylor, head of the civil engineering department of Union College retires this summer after 40 years of service, and almost 50 years of engineering practice since his graduation from Massachusetts Institute of Technology with the class of 1902, 48 years ago.

MAJOR MEETINGS

American Society of Civil Engineers, annual convention, Hotel York, Toronto, two days, Aug. 24

Photogrammetry Seminar, University of Denver, Denver, Colo., Aug. 7-11

Maine Water Utilities Association, summer meeting, Mt. Desert Island, Me., Aug.

ASCE, North Carolina section, joint meeting with N. C. Society of Engineers, Whitehall Hotel, Pinehurst, N. C., Aug. 18-19

Pennsylvania Water Works Operators Association, [illegible], Aug. 21-22

Pennsylvania Sewage & Industrial Wastes Association, Summer [illegible], Penn State College, Pa., Aug. 23-24

N. Y. section AWWA, fall meeting, Saratoga Inn, Saranac Lake, N. Y., Sept. 7-8

W. Va. section AWWA, annual meeting, Guyandotte Hotel, Huntington, W. Va., Sept. 10-11

American Railway Bridge and Building Association, annual meeting, Hotel Stevens, Chicago, Ill., Sept. 18-20

New England Water Works Association, Drake Hotel, Quincy, Mass., Sept. 19-21

N. Y. Metropolitan section, Institute of Traffic Engineers, annual meeting, Commodore Hotel, N. Y. City, Sept. 24-27

American Institute of Park Executives, annual meeting, Hotel [illegible], Sept. 25-28

Pennsylvania Water Works Association, Claridge Hotel, Atlantic City, N. J., Sept. 25-28

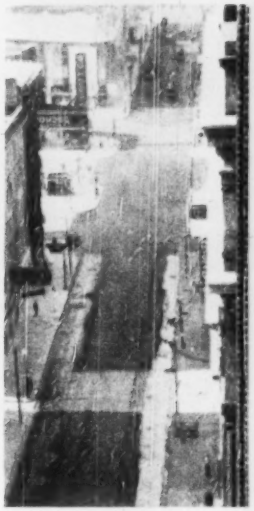
Rocky Mountain Sewage Works Association, La Fonda Hotel, Santa Fe, N. M., Sept. 27-29

Barber-Greene *Photo-News*

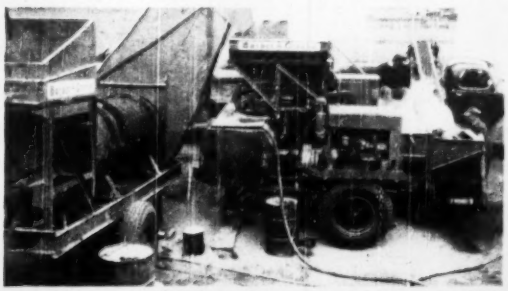
ON-THE-JOB VIEWS AND COST-SAVING IDEAS VOLUME 1—NUMBER 2

OPERATION ASPHALT SETS PAVING RECORD

Baltimore broke all existing street paving records when 14 blocks of arterial streets were paved in one day. Such speed was necessary if costly interruptions and tie-up time were to be held to a minimum. Ten Barber-Greene Finishers placed the required 23,500 sq. yds. of 2 and 3 course hot-mix in 13½ hours . . . to everyone's complete satisfaction. Contractors (7 cooperated), city officials and engineers . . . even the "sidewalk superintendents" . . . agreed that "Operation Asphalt" was a huge success.



Complete Maintenance Plant in Portable Package



PAVING PACE FAST IN VERMONT, TOO

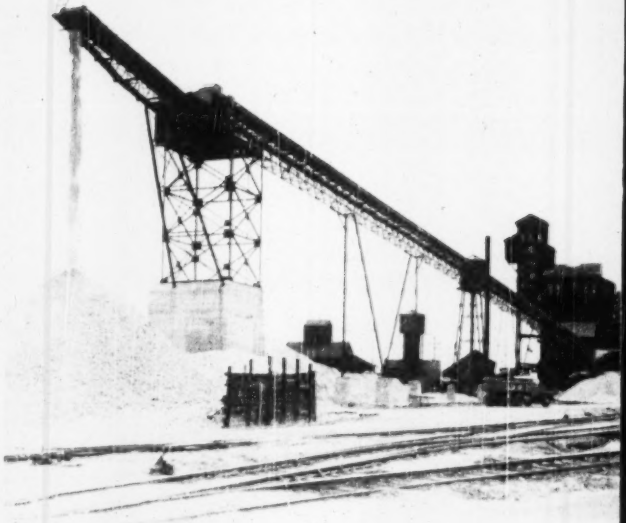
Up here in the northern reaches of the U. S., the Highway Department of Vermont sees to it that this B-G Portable Maintenance Plant really gets around. Ten moves were made in each of the last two seasons. The plant processed as much as 35,000 tons of cold-mix before January snow forced a shutdown. Each of these moves was completed in less than three days, including an average of 75 miles of road travel between set-ups. This quick, economical portability is a big cost-cutting advantage. It enables the state of Vermont to profitably handle a large amount of its own maintenance work on a year-round basis.

Close-up from Dryer end. Note set-up in yard.

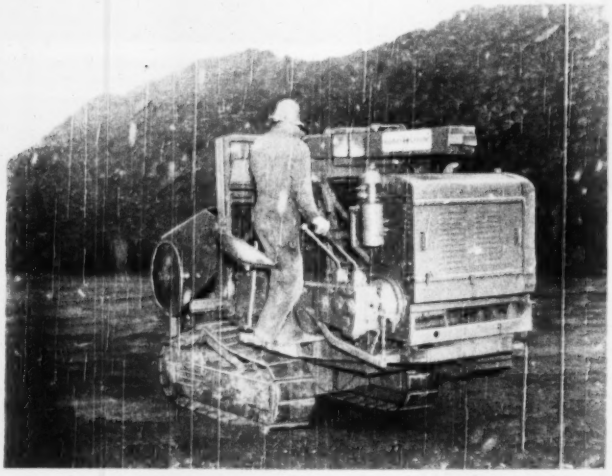
Barber-Greene *Photo-News*

CONVEYOR SYSTEM DOUBLES in DOLOMITE

A unique system for handling two different types of products has been built around this B-G Permanent Conveyor by Consumers Co. of McCook, Illinois. Here you see it carrying limestone from the crusher to discharge from a height of 56' onto a surge pile. Capacity is 600 tons per hour. Tunnel conveyor beneath surge pile carries stone under tracks to dolomite plant. When the second product—limestone for railroad ballast, road and construction work—is being processed, a B-G Tripper spills material from the conveyor into a bucket elevator. The limestone is then carried into the main processing plant. Here is another example of how the effective use of simple, standardized B-G Conveyors minimizes the expense and manpower of high capacity moving of bulk materials. Note how small, under-hung conveyor discharges to clear the supports.



SAVINGS MARKED OFF BY THE ACRE The Hanna Coal Company is now saving an estimated 200 to 400 tons of coal per acre at their Number 12 Mine in Georgetown, Ohio. This is coal that was previously left in the mine, buried under the spoil from previous cuts. But now with the help of this B-G machine, the shovel operator is loading out nearly 100%. The B-G Ditcher, in this operation called a "marking machine," cuts a 5" wide trench to the full depth of the seam, marking a "go-no-farther" line for the shovel, and leaving a vertical wall in place of a saw-tooth edge which formerly trapped coal under spoil. This is another example of sound B-G engineering solving unusual problems economically, simply, with minimum manpower.



BAY CITY BEAUTIFIER

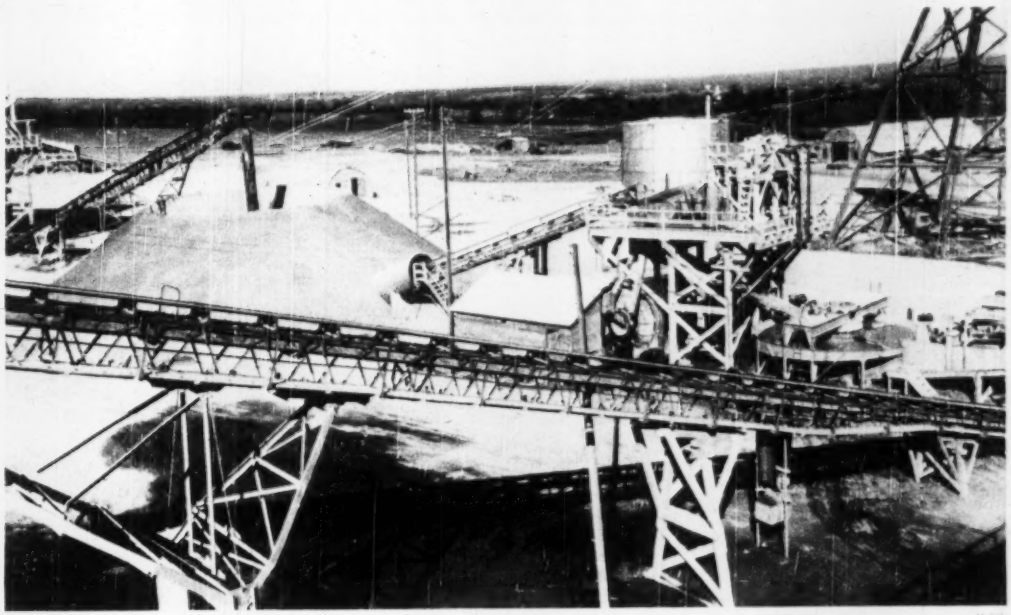
San Francisco has long been noted for its beautiful parks and beaches. Now, to insure that those parks and long stretches of white sand remain the envy of the world, a B-G Crawler-Mounted Bucket Loader performs a multitude of services for the Park Commission. They use it to clear away drifted sand in the dividing strip of seaside multi-laned highways, stripping loam for use in maintaining or establishing new grass areas, as a loader of debris, sand, etc., as an excavator for cutting new park paths. The beaches get their beauty treatment at frequent intervals when the B-G Loader patrols the bathing strip, removing glass, stones, paper . . . even an occasional watch or ring.

for full, fast information on any equipment

Barber-Greene *Photo-News*

BELT CONVEYORS AND "COMPATIBILITY"

Skillful use of belt conveyors is simplifying the job of handling aggregate for the $20,000,000 flood control project now being constructed by the Mount Morris Dam builders. Featuring the latest in push-button control, the aggregate plant is geared to produce 5 grades of aggregate from the same stone (for aggregate compatibility) at the rate of 4500 tons per day. This impressive production achievement is made possible largely through the use of 17 belt conveyors that handle all stone and aggregate from raw storage to concrete plant. Typical of the jobs B-G standardized, easy-to-install, conveyors are doing, is the first stock pile belt, a 36" x 198' unit with a capacity of 500 tons per hour. The many B-G pre-engineered conveyors in this system are contributing greatly to the efficient, economical handling of aggregate for the 900,000 cu. yds. of concrete required.



BIG, RUGGED — AND PORTABLE

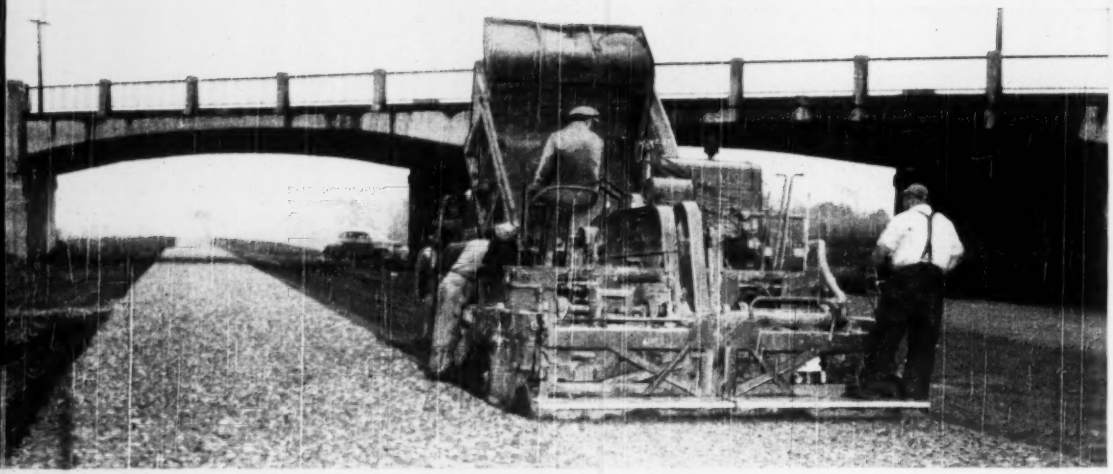
In quarries or gravel pits, in the yards of State, County, and Municipal Highway Departments, railroads, mines, mills, in any industry — any place where heavy duty portable conveying service is a "must" — this new B-G Portable Conveyor is right at home. In spite of rugged construction for toughest operation, this conveyor is highly portable. It is equipped with a low mast truck which speeds movement in and around buildings, guards against damage from underpasses while towing. It is THE heavy-duty portable. Send for your copy of new literature.

FOR A TRIM LOAD EVERY TIME

Hydraulically controlled conveyor on this new B-G Loader swivels to trim every load . . . eliminates spillage or partly filled trucks. This flexibility, plus long reach, allows filling largest, highest trucks, trailers — even railroad cars — to full capacity at a 3 yd. per minute clip. Newest in the B-G line, this Loader travels at 15 M.P.H. on its pneumatic-tired chassis. Easily converted to a 7-11 yd. per minute snow loader to give year-round service. New literature — now on the press — illustrates the many features of this newest B-G Heavy-duty Loader.

on these pages -- see your B-G Distributor

Barber-Greene *Photo-News*



CRUSHED STONE MANTEL FOR THE QUEEN'S WAY

Two B-G Finishers recently completed laying 110,000 tons of stone along the Queen Elizabeth Way between Fort Erie and Niagara Falls, a distance of 18 miles. Often working in tandem, these two green machines spread two courses of raw stone for this penetration macadam in sizes up to 3½". In spite of this tough abrasive material, both Finishers went through the entire job without an hour's delay . . . completing it in only 1,000 working hours. The final surface is a smooth, durable highway . . . the pride of the province. In the words of the engineers "... it cannot be beat."

MAKING WAY WHILE THE SUN SHINES

In spite of freakish storms and weather extremes, the C. H. Atkinson Co. was able to make way while weather permitted and pave 7.8 miles of U. S. 36 out of Chillicothe, Mo., last season in near-normal time. Chief contributor to this performance was a B-G Utility Mixing Plant and Dryer that turned out top quality mix at a 60 ton per hour rate. Of particular advantage was the Utility Dryer which solved the moisture control problem and assured mixes of a quality that would have been otherwise unobtainable due to the heavy rainfall. A B-G Finisher placed two 3" courses of type B hot-mixed asphaltic concrete over the 20-year-old concrete slab. This was a quick transformation of a rutted, broken roadway with a minimum of interference to normal traffic.

A 34-YEAR INVESTMENT IN YOUR BUSINESS

Behind every machine in the broad Barber-Greene line stands a 34-year investment in experience, engineering and material handling techniques. This investment can save you money whenever and wherever your problems involve the handling of bulk materials . . . mixing and placing bituminous surfacing materials . . . as well as ditching and snow removal. Use this investment. Call on your factory-trained, job-experienced Barber-Greene Distributor. Ask him to help you get the most in cost cutting operation by eliminating the use of expensive equipment and manpower. Further, your Barber-Greene Distributor has service and repair part facilities you can depend upon through the years. For complete information — bulletins, specifications and prices on any or all Barber-Greene equipment — get in touch with your B-G Distributor or call, write or wire directly to the address below.

Barber-Greene Company

AURORA, ILLINOIS, U. S. A.

OBITUARY

Prof. Frederick William Greve, 64, hydraulic engineer and member of the civil engineering staff of Purdue University, Lafayette, Ind., since 1911, died June 14. He was an inventor of several instruments and improvements in his field and engaged in basic research in the hydraulics field.

Christopher C. Bannigartner, 75, retired inspector for the Corps of Engineers and formerly inspector for Los Angeles city engineers, died in Los Angeles June 11. He had been active in the construction of 90 percent of southern California dam projects since 1910.

John M. Balk, 71, vice president of the Construction Aggregates Corp., sand and gravel dealers, died in Oak Park, Ill. June 12. He had been in that business since 1908.

Edward L. Jenkins, 67, civil engineer and a champion tennis player, died in New York City, June 17. He received his engineering degree from The Citadel, Charleston, S. C. During the first world war, he was West Coast manager of the Foundation Co. and had been supervisor of the firm's shipyards in Victoria, B. C., Portland, Ore., and Seattle, Wash. In later years he was N. Y. district manager of the Medusa Portland Cement Co. and general manager of the Griffin Wellpoint Corp.

Charles A. Brown, 84, former assistant city engineer at Indianapolis, Ind., died June 12. He retired in 1925. He was a graduate of Butler University, Indianapolis.

Myron T. Jones, 52, Columbus, Ohio, consulting civil engineer, and past president of the Franklin County chapter of the Ohio Society of Professional Engineers, died June 11.

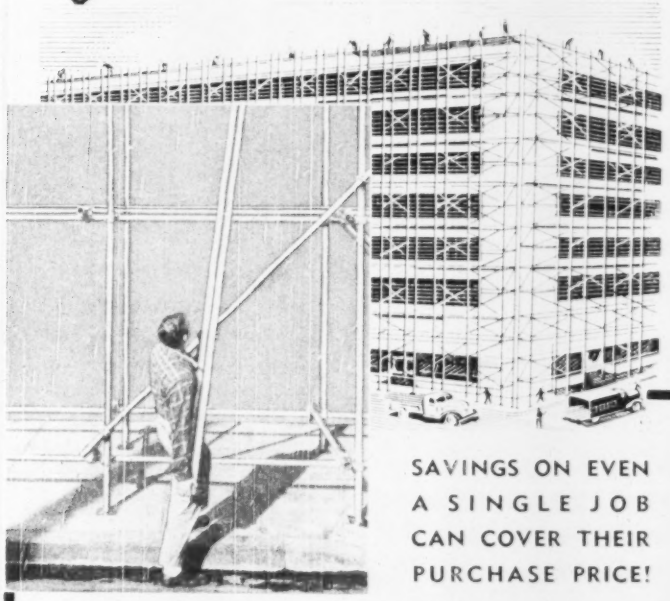
Robert G. Brown, 55, road superintendent for the Summit County, Ohio, engineering department in the southern part of the county, died June 12 at Portage Lakes. He had been with the county engineering department for 15 years.

William B. Poland, 83, civil engineer and chief consultant to the Board of Economic Warfare in the War, died at Washington, D. C. June 27. He was a graduate of M.I.T. In 1925 he reorganized the railway system in Peru.

S. S. Jacobs, 63, construction engineer

BASICALLY SUPERIOR SCAFFOLDS REDUCE LABOR COSTS 50%!

NEW **UP-RIGHT *Aluminum Alloy* "*Tube-and-Coupler*" SCAFFOLDS**



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★ **GREATER STRENGTH!** 1/3 stronger than conventional "iron pipe" scaffolding. Heavy duty: will carry load of over 75 lbs. per square foot with safety factor of 4. Exceeds all existing safety code requirements.

★ **RAPID ASSEMBLY!** New exclusive Up-Right couplers and locking tubes. Swivel base plates require no wedging.

★ **DOUBLE LOAD-CARRYING ABILITY!** Aluminum alloy couplers on aluminum alloy tubes provide twice the gripping friction of steel on steel.

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Use HENDRICK ARMORGRIDS

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For floors, loading platforms, ramps, driveways . . . No traffic punishment is too tough for Hendrick Mitco Armorgrids . . . Completely fabricated units, they require no bolts, rivets, or assembly work . . . Easy and economical to install . . . May be used with fill of concrete, cement, asphalt, or composition material . . . Do not depend on the fill for development of full strength to resist shock loads . . . Never require rebuilding . . . Write for copy of Hendrick Mitco Products booklet

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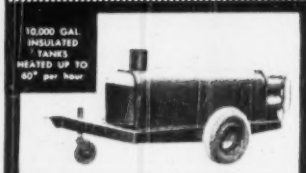

More Asphalt Heated per Hour with **RAPID FIRE HEATER**

W. E. GRACE MFG. CO.

6015 S. Lamar St Dallas, Texas

and active in civic affairs of Jacksonville, Fla., died June 12 in Boston, Mass. He was president of S. S. Jacobs Co., a construction firm. He was graduated from Washington University, St. Louis, Mo., in 1909 as a civil engineer. He constructed the Tallahassee Army Air Base, MacDill Field at Tampa, and the dirigible base at Richmond, Fla.

Charles J. Sullivan, 60, a civil engineer with the New York State Department of Public Works for more than 30 years, died June 7 in West Sand Lake, N. Y. He was graduated from R.P.I. in 1913.

Burgess Manchester, 57, civil engineer, died in Omaha, Neb., May 25. He had served 30 years with the Metropolitan Utilities District.

Raymond M. Whorley, 47, of Bernardsville, N. J., died June 7. He was a civil engineer graduate of the Pennsylvania Military College, 1923. Since 1945 he had been a civil engineer with Leslie M. Apgar, Far Hills, N. J.

George E. Willard, 60, an engineer, died June 7, at Doylestown, Pa. During his tenure as a member of the Doylestown Borough Council he supervised construction of the community's municipal water plant.

George J. Rathbun, Sr., 79, president and treasurer of the Rathbun-Jones Engineering Co., Toledo, Ohio, died June 19. He was graduated from Cornell University in 1895. He was one of the founders of his company.

Edgar Brearley, 62, chief engineer of the sewage section of the department of works, Toronto, Ont., with which he had been associated for more than 24 years, died June 15.

LeRoy M. Bartless, 57, construction engineer with the Corps of Engineers, died at Portland, Ore., June 12. At the time of his death he was engaged in work on Lookout Point Dam, a unit of the Willamette Basin flood control project.

DeWitt Rapalje, 69, retired consulting civil engineer, who had lived in Plainfield, N. J., for 59 years, died at Maplewood, N. J., June 23. He was a civil engineering graduate from Rutgers University in 1900, and for many years was chief fire prevention engineer of the Railroad Insurance Association, New York, and was active in the fire protection and insurance section of the Association of American Railroads. In recent years he served as engineer for the Emergency Housing Committee of Plainfield.

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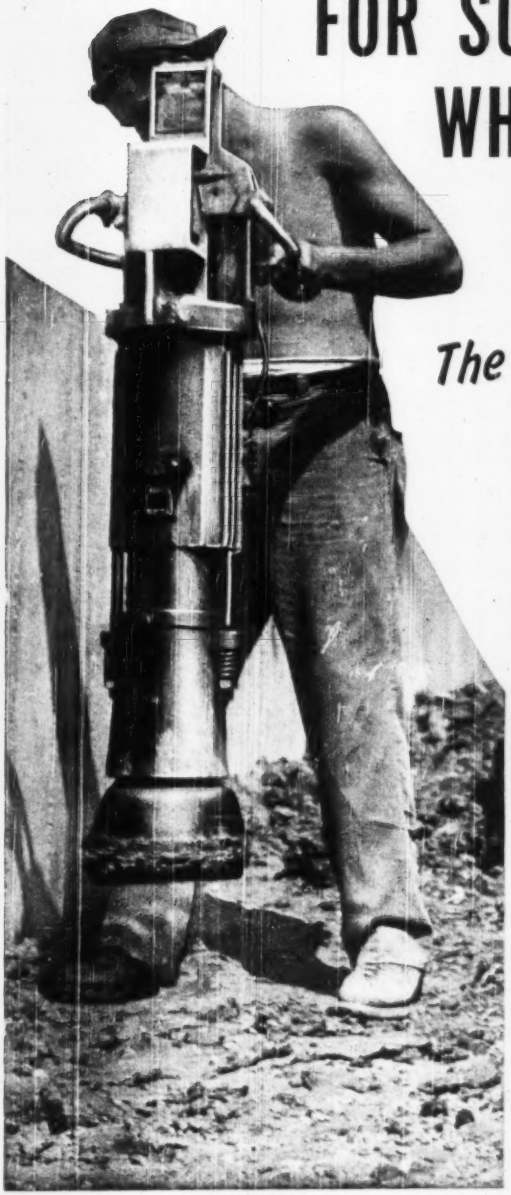

This self-contained, portable rammer is specially adaptable to tamping close to abutments and other wall structures, in narrow ditches and trenches, thus eliminating troublesome settlement areas. Actual field tests, certified by Government agencies, have proved that one man using the Barco can do *the work of five* who use conventional equipment! This economical machine is easy to operate—no lifting, no strain, no vibration. A slight tilt on the handle will "walk" the Barco wherever you want it to go. Don't tie up your funds in heavy equipment—order Barco today. Write for free demonstration or catalog to Barco Manufacturing Co., 1814H Winnemac Avenue, Chicago 40, Ill.

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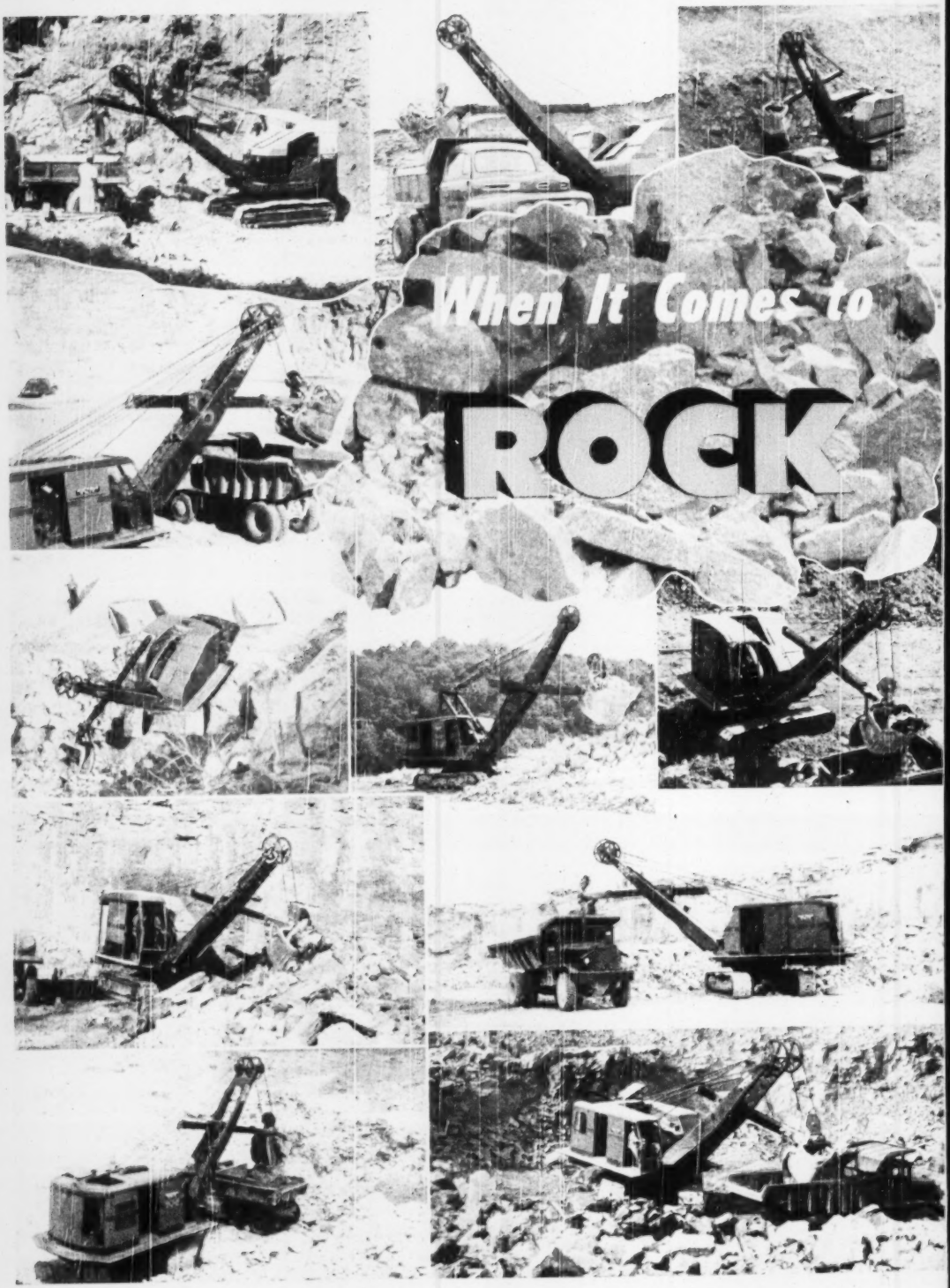
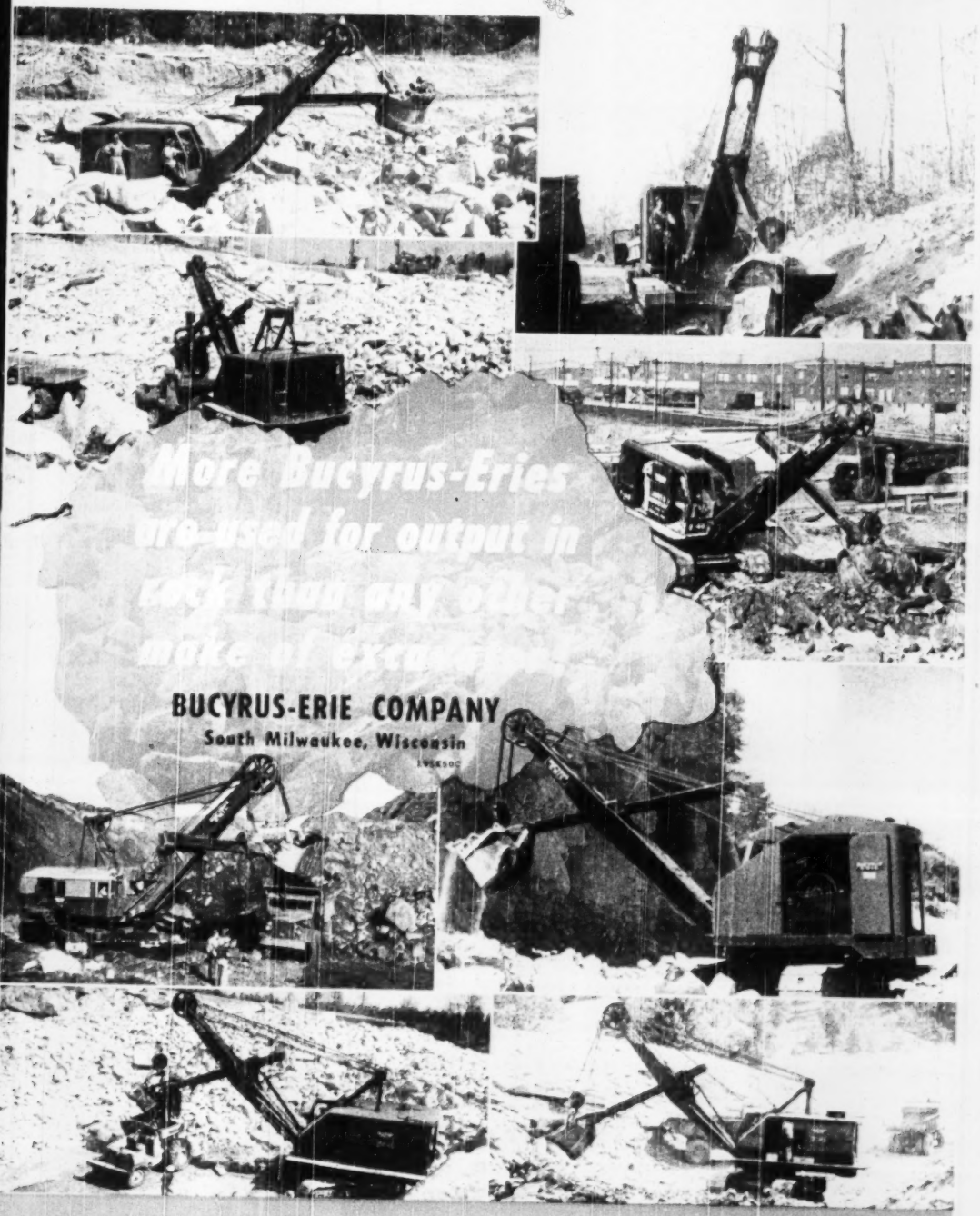

When It Comes to
ROCK



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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *M. R. ROESSLER, Statistics*

WATER SUPPLY

BIDS ASKED

† Wash., Arlington—B.A. 7/19—U.S. Navy Officer in Charge of Construction, 1411 4th Ave. Bldg., Seattle, water supply sys.: transmitter area, U.S. Naval Communication Station, Jim Creek, Isom. 24982. Plans deposit $10.

LOW BIDDERS

† D. C., Wash.—U.S. Eng., Flost and Douglas Sts., N.W., June 22, constr. Sedimentation Basin 2 at Georgetown Reservoir on Mac Arthur Blvd. about 1 mi. west of Georgetown, to Blakewell Eng. Co., Warrenton, Va., $545,515. CD 5/29.

Md., Baltimore—State Rd. Comm., 606 Park Ave., underground utilities for Morgan State College, Sect. 1, and Certs. 1 and 2, outlined from Wesley Freeman, Inc., 1700 Friendship pl., $24,480, and $41,840 respectively; Sect. 1, and 2, outlined from A. H. Lawrence Co., $60,864. Eng. & Constr., Inc., 1019 N. Calvert St., Zone 2, recv., John B. Funk, Baltimore Zone 1, sub. engr.

Md., Hyattsville—Washington Suburban Sanitary Comm., Hamilton St. June 14, water mains, concrete or vitr. clay sewers in four sections, Prog. Mt. Rainier Dist., Contr. 765, from Nurses Bros., 4707 Baltimore Ave., $46,065. Id., water mains, concrete or vitr. clay sewers, incl. house connections, Berwyn Dist., Contr. 771, from Allen Bros., 2716 Fred. Rd., W. Lanahan Bros., P.O., Hyattsville, $28,725.

Mo., St. Louis—City, Frank H. McDonald, pres. Bd. Public Service, City Hall, June 16, cleaning, repairing, lining and reinforcing of spring 1,910 ft. to and incl. 54" intercept. Intercept Station plant to and incl. Park Research St., St. Louis Co., from contractor, City, 141 Water St., New York, $104,958. Est. $70,000. CD 6/12.

N. C., Oxford—City, June 13, water and sewer improv., from W. M. Aiken & Assoc., Piedmont Bldg., Charlotte, $40,131. Asso. E. Freeman Engineers, Inc., High Point, engr.

S. C., Fingerville—Fingerville Project Spinning Mill, Fingerville, June 14, water and sewer improv., from Co. E. Moore Co., Greenwood, $63,086. CD 6/12.

Tex., Carrizo Springs—City, June 16, water distr. sys., from Frank Butcher Co., 213 Fredericksburg Rd., San Antonio, $42,456. Est. $35,000. CD 5/26.

Tex., North Pleasanton—City, June 16, WW lines, etc., from Wadsmund Logan Jr., 422 Hays St., San Antonio, $29,865. Est. $ 000. Frank T. Drought, 112 W. Houston St., Alamo, engr.

CONTRACTS AWARDED

▲ Ala., Mobile—Mobile Water and Sewerage Bd., Big Creek water supply, to Carl E. Bryan, P.O. Box 1, Daphne, $1,362,662. Bids 5/16. CD 5/17, under EE.

La., Sunset—Town, water distr. sys., to Cumbest Welding Works, Natchez, Miss., $28,118, treatment plant, to Barnet Breezer, Alexandria, $41,360. Bids 6/13.

SEWERS, WASTE DISPOSAL

BIDS ASKED

▲ Que., Montreal—B.A. 7/15—Executive Com. City Hall, tributary sewer, 2 mi., 9 ft. to height, concrete walls, extend from Camille St. along Jeune St. to Papineau Ave., $1,500,000. Plans deposit $50. H. Gibeau, City Hall, Engineer.

LOW BIDDERS

Ill., Chicago—Sanitary Dist. of Chicago, 320 S. Michigan Ave., Chicago, Intercepting Sewer Constr. Lot 1 on 37th St. tunnel, Lot 2 on Ashland Ave. tunnel, Lot 3 on Western Ave. tunnel, N. Kilbourne to 39th St., $925,000. Est. $ 000. Lot 4 on Western Ave. tunnel, 39th St. to Pershing Rd., $1,100,000. Est. $ 000. Lot 5 on Western Ave. tunnel, Pershing Rd. to 47th St., $1,100,000. Est. $ 000. Lot 6 on Western Ave. tunnel, 47th St. to 55th St., $1,100,000. Est. $ 000. Lot 7 on Western Ave. tunnel, 55th St. to Garfield Blvd., $1,100,000. Est. $ 000. Lot 8 on Western Ave. tunnel, Garfield Blvd. to 63rd St., $1,100,000. Est. $ 000. Lot 9 on Western Ave. tunnel, 63rd St. to 71st St., $1,100,000. Est. $ 000. Lot 10 on Western Ave. tunnel, 71st St. to 79th St., $1,100,000. Est. $ 000. Lot 11 on Western Ave. tunnel, 79th St. to 87th St., $1,100,000. Est. $ 000. Lot 12 on Western Ave. tunnel, 87th St. to 95th St., $1,100,000. Est. $ 000. Lot 13 on Western Ave. tunnel, 95th St. to 103rd St., $1,100,000. Est. $ 000. Lot 14 on Western Ave. tunnel, 103rd St. to 111th St., $1,100,000. Est. $ 000. Lot 15 on Western Ave. tunnel, 111th St. to 119th St., $1,100,000. Est. $ 000. Lot 16 on Western Ave. tunnel, 119th St. to 127th St., $1,100,000. Est. $ 000. Lot 17 on Western Ave. tunnel, 127th St. to 135th St., $1,100,000. Est. $ 000. Lot 18 on Western Ave. tunnel, 135th St. to 143rd St., $1,100,000. Est. $ 000. Lot 19 on Western Ave. tunnel, 143rd St. to 151st St., $1,100,000. Est. $ 000. Lot 20 on Western Ave. tunnel, 151st St. to 159th St., $1,100,000. Est. $ 000. Lot 21 on Western Ave. tunnel, 159th St. to 167th St., $1,100,000. Est. $ 000. Lot 22 on Western Ave. tunnel, 167th St. to 175th St., $1,100,000. Est. $ 000. Lot 23 on Western Ave. tunnel, 175th St. to 183rd St., $1,100,000. Est. $ 000. Lot 24 on Western Ave. tunnel, 183rd St. to 191st St., $1,100,000. Est. $ 000. Lot 25 on Western Ave. tunnel, 191st St. to 199th St., $1,100,000. Est. $ 000. Lot 26 on Western Ave. tunnel, 199th St. to 207th St., $1,100,000. Est. $ 000. Lot 27 on Western Ave. tunnel, 207th St. to 215th St., $1,100,000. Est. $ 000. Lot 28 on Western Ave. tunnel, 215th St. to 223rd St., $1,100,000. Est. $ 000. Lot 29 on Western Ave. tunnel, 223rd St. to 231st St., $1,100,000. Est. $ 000. Lot 30 on Western Ave. tunnel, 231st St. to 239th St., $1,100,000. Est. $ 000. Lot 31 on Western Ave. tunnel, 239th St. to 247th St., $1,100,000. Est. $ 000. Lot 32 on Western Ave. tunnel, 247th St. to 255th St., $1,100,000. Est. $ 000. Lot 33 on Western Ave. tunnel, 255th St. to 263rd St., $1,100,000. Est. $ 000. Lot 34 on Western Ave. tunnel, 263rd St. to 271st St., $1,100,000. Est. $ 000. Lot 35 on Western Ave. tunnel, 271st St. to 279th St., $1,100,000. Est. $ 000. Lot 36 on Western Ave. tunnel, 279th St. to 287th St., $1,100,000. Est. $ 000. Lot 37 on Western Ave. tunnel, 287th St. to 295th St., $1,100,000. Est. $ 000. Lot 38 on Western Ave. tunnel, 295th St. to 303rd St., $1,100,000. Est. $ 000. Lot 39 on Western Ave. tunnel, 303rd St. to 311th St., $1,100,000. Est. $ 000. Lot 40 on Western Ave. tunnel, 311th St. to 319th St., $1,100,000. Est. $ 000. Lot 41 on Western Ave. tunnel, 319th St. to 327th St., $1,100,000. Est. $ 000. Lot 42 on Western Ave. tunnel, 327th St. to 335th St., $1,100,000. Est. $ 000. Lot 43 on Western Ave. tunnel, 335th St. to 343rd St., $1,100,000. Est. $ 000. Lot 44 on Western Ave. tunnel, 343rd St. to 351st St., $1,100,000. Est. $ 000. Lot 45 on Western Ave. tunnel, 351st St. to 359th St., $1,100,000. Est. $ 000. Lot 46 on Western Ave. tunnel, 359th St. to 367th St., $1,100,000. Est. $ 000. Lot 47 on Western Ave. tunnel, 367th St. to 375th St., $1,100,000. Est. $ 000. Lot 48 on Western Ave. tunnel, 375th St. to 383rd St., $1,100,000. Est. $ 000. Lot 49 on Western Ave. tunnel, 383rd St. to 391st St., $1,100,000. Est. $ 000. Lot 50 on Western Ave. tunnel, 391st St. to 399th St., $1,100,000. Est. $ 000. Lot 51 on Western Ave. tunnel, 399th St. to 407th St., $1,100,000. Est. $ 000. Lot 52 on Western Ave. tunnel, 407th St. to 415th St., $1,100,000. Est. $ 000. Lot 53 on Western Ave. tunnel, 415th St. to 423rd St., $1,100,000. Est. $ 000. Lot 54 on Western Ave. tunnel, 423rd St. to 431st St., $1,100,000. Est. $ 000. Lot 55 on Western Ave. tunnel, 431st St. to 439th St., $1,100,000. Est. $ 000. Lot 56 on Western Ave. tunnel, 439th St. to 447th St., $1,100,000. Est. $ 000. Lot 57 on Western Ave. tunnel, 447th St. to 455th St., $1,100,000. Est. $ 000. Lot 58 on Western Ave. tunnel, 455th St. to 463rd St., $1,100,000. Est. $ 000. Lot 59 on Western Ave. tunnel, 463rd St. to 471st St., $1,100,000. Est. $ 000. Lot 60 on Western Ave. tunnel, 471st St. to 479th St., $1,100,000. Est. $ 000. Lot 61 on Western Ave. tunnel, 479th St. to 487th St., $1,100,000. Est. $ 000. Lot 62 on Western Ave. tunnel, 487th St. to 495th St., $1,100,000. Est. $ 000. Lot 63 on Western Ave. tunnel, 495th St. to 503rd St., $1,100,000. Est. $ 000. Lot 64 on Western Ave. tunnel, 503rd St. to 511th St., $1,100,000. Est. $ 000. Lot 65 on Western Ave. tunnel, 511th St. to 519th St., $1,100,000. Est. $ 000. Lot 66 on Western Ave. tunnel, 519th St. to 527th St., $1,100,000. Est. $ 000. Lot 67 on Western Ave. tunnel, 527th St. to 535th St., $1,100,000. Est. $ 000. Lot 68 on Western Ave. tunnel, 535th St. to 543rd St., $1,100,000. Est. $ 000. Lot 69 on Western Ave. tunnel, 543rd St. to 551st St., $1,100,000. Est. $ 000. Lot 70 on Western Ave. tunnel, 551st St. to 559th St., $1,100,000. Est. $ 000. Lot 71 on Western Ave. tunnel, 559th St. to 567th St., $1,100,000. Est. $ 000. Lot 72 on Western Ave. tunnel, 567th St. to 575th St., $1,100,000. Est. $ 000. Lot 73 on Western Ave. tunnel, 575th St. to 583rd St., $1,100,000. Est. $ 000. Lot 74 on Western Ave. tunnel, 583rd St. to 591st St., $1,100,000. Est. $ 000. Lot 75 on Western Ave. tunnel, 591st St. to 599th St., $1,100,000. Est. $ 000. Lot 76 on Western Ave. tunnel, 599th St. to 607th St., $1,100,000. Est. $ 000. Lot 77 on Western Ave. tunnel, 607th St. to 615th St., $1,100,000. Est. $ 000. Lot 78 on Western Ave. tunnel, 615th St. to 623rd St., $1,100,000. Est. $ 000. Lot 79 on Western Ave. tunnel, 623rd St. to 631st St., $1,100,000. Est. $ 000. Lot 80 on Western Ave. tunnel, 631st St. to 639th St., $1,100,000. Est. $ 000. Lot 81 on Western Ave. tunnel, 639th St. to 647th St., $1,100,000. Est. $ 000. Lot 82 on Western Ave. tunnel, 647th St. to 655th St., $1,100,000. Est. $ 000. Lot 83 on Western Ave. tunnel, 655th St. to 663rd St., $1,100,000. Est. $ 000. Lot 84 on Western Ave. tunnel, 663rd St. to 671st St., $1,100,000. Est. $ 000. Lot 85 on Western Ave. tunnel, 671st St. to 679th St., $1,100,000. Est. $ 000. Lot 86 on Western Ave. tunnel, 679th St. to 687th St., $1,100,000. Est. $ 000. Lot 87 on Western Ave. tunnel, 687th St. to 695th St., $1,100,000. Est. $ 000. Lot 88 on Western Ave. tunnel, 695th St. to 703rd St., $1,100,000. Est. $ 000. Lot 89 on Western Ave. tunnel, 703rd St. to 711th St., $1,100,000. Est. $ 000. Lot 90 on Western Ave. tunnel, 711th St. to 719th St., $1,100,000. Est. $ 000. Lot 91 on Western Ave. tunnel, 719th St. to 727th St., $1,100,000. Est. $ 000. Lot 92 on Western Ave. tunnel, 727th St. to 735th St., $1,100,000. Est. $ 000. Lot 93 on Western Ave. tunnel, 735th St. to 743rd St., $1,100,000. Est. $ 000. Lot 94 on Western Ave. tunnel, 743rd St. to 751st St., $1,100,000. Est. $ 000. Lot 95 on Western Ave. tunnel, 751st St. to 759th St., $1,100,000. Est. $ 000. Lot 96 on Western Ave. tunnel, 759th St. to 767th St., $1,100,000. Est. $ 000. Lot 97 on Western Ave. tunnel, 767th St. to 775th St., $1,100,000. Est. $ 000. Lot 98 on Western Ave. tunnel, 775th St. to 783rd St., $1,100,000. Est. $ 000. Lot 99 on Western Ave. tunnel, 783rd St. to 791st St., $1,100,000. Est. $ 000. Lot 100 on Western Ave. tunnel, 791st St. to 799th St., $1,100,000. Est. $ 000. Lot 101 on Western Ave. tunnel, 799th St. to 807th St., $1,100,000. Est. $ 000. Lot 102 on Western Ave. tunnel, 807th St. to 815th St., $1,100,000. Est. $ 000. Lot 103 on Western Ave. tunnel, 815th St. to 823rd St., $1,100,000. Est. $ 000. Lot 104 on Western Ave. tunnel, 823rd St. to 831st St., $1,100,000. Est. $ 000. Lot 105 on Western Ave. tunnel, 831st St. to 839th St., $1,100,000. Est. $ 000. Lot 106 on Western Ave. tunnel, 839th St. to 847th St., $1,100,000. Est. $ 000. Lot 107 on Western Ave. tunnel, 847th St. to 855th St., $1,100,000. Est. $ 000. Lot 108 on Western Ave. tunnel, 855th St. to 863rd St., $1,100,000. Est. $ 000. Lot 109 on Western Ave. tunnel, 863rd St. to 871st St., $1,100,000. Est. $ 000. Lot 110 on Western Ave. tunnel, 871st St. to 879th St., $1,100,000. Est. $ 000. Lot 111 on Western Ave. tunnel, 879th St. to 887th St., $1,100,000. Est. $ 000. Lot 112 on Western Ave. tunnel, 887th St. to 895th St., $1,100,000. Est. $ 000. Lot 113 on Western Ave. tunnel, 895th St. to 903rd St., $1,100,000. Est. $ 000. Lot 114 on Western Ave. tunnel, 903rd St. to 911th St., $1,100,000. Est. $ 000. Lot 115 on Western Ave. tunnel, 911th St. to 919th St., $1,100,000. Est. $ 000. Lot 116 on Western Ave. tunnel, 919th St. to 927th St., $1,100,000. Est. $ 000. Lot 117 on Western Ave. tunnel, 927th St. to 935th St., $1,100,000. Est. $ 000. Lot 118 on Western Ave. tunnel, 935th St. to 943rd St., $1,100,000. Est. $ 000. Lot 119 on Western Ave. tunnel, 943rd St. to 951st St., $1,100,000. Est. $ 000. Lot 120 on Western Ave. tunnel, 951st St. to 959th St., $1,100,000. Est. $ 000. Lot 121 on Western Ave. tunnel, 959th St. to 967th St., $1,100,000. Est. $ 000. Lot 122 on Western Ave. tunnel, 967th St. to 975th St., $1,100,000. Est. $ 000. Lot 123 on Western Ave. tunnel, 975th St. to 983rd St., $1,100,000. Est. $ 000. Lot 124 on Western Ave. tunnel, 983rd St. to 991st St., $1,100,000. Est. $ 000. Lot 125 on Western Ave. tunnel, 991st St. to 999th St., $1,100,000. Est. $ 000. Lot 126 on Western Ave. tunnel, 999th St. to 1007th St., $1,100,000. Est. $ 000. Lot 127 on Western Ave. tunnel, 1007th St. to 1015th St., $1,100,000. Est. $ 000. Lot 128 on Western Ave. tunnel, 1015th St. to 1023rd St., $1,100,000. Est. $ 000. Lot 129 on Western Ave. tunnel, 1023rd St. to 1031st St., $1,100,000. Est. $ 000. Lot 130 on Western Ave. tunnel, 1031st St. to 1039th St., $1,100,000. Est. $ 000. Lot 131 on Western Ave. tunnel, 1039th St. to 1047th St., $1,100,000. Est. $ 000. Lot 132 on Western Ave. tunnel, 1047th St. to 1055th St., $1,100,000. Est. $ 000. Lot 133 on Western Ave. tunnel, 1055th St. to 1063rd St., $1,100,000. Est. $ 000. Lot 134 on Western Ave. tunnel, 1063rd St. to 1071st St., $1,100,000. Est. $ 000. Lot 135 on Western Ave. tunnel, 1071st St. to 1079th St., $1,100,000. Est. $ 000. Lot 136 on Western Ave. tunnel, 1079th St. to 1087th St., $1,100,000. Est. $ 000. Lot 137 on Western Ave. tunnel, 1087th St. to 1095th St., $1,100,000. Est. $ 000. Lot 138 on Western Ave. tunnel, 1095th St. to 1103rd St., $1,100,000. Est. $ 000. Lot 139 on Western Ave. tunnel, 1103rd St. to 1111th St., $1,100,000. Est. $ 000. Lot 140 on Western Ave. tunnel, 1111th St. to 1119th St., $1,100,000. Est. $ 000. Lot 141 on Western Ave. tunnel, 1119th St. to 1127th St., $1,100,000. Est. $ 000. Lot 142 on Western Ave. tunnel, 1127th St. to 1135th St., $1,100,000. Est. $ 000. Lot 143 on Western Ave. tunnel, 1135th St. to 1143rd St., $1,100,000. Est. $ 000. Lot 144 on Western Ave. tunnel, 1143rd St. to 1151st St., $1,100,000. Est. $ 000. Lot 145 on Western Ave. tunnel, 1151st St. to 1159th St., $1,100,000. Est. $ 000. Lot 146 on Western Ave. tunnel, 1159th St. to 1167th St., $1,100,000. Est. $ 000. Lot 147 on Western Ave. tunnel, 1167th St. to 1175th St., $1,100,000. Est. $ 000. Lot 148 on Western Ave. tunnel, 1175th St. to 1183rd St., $1,100,000. Est. $ 000. Lot 149 on Western Ave. tunnel, 1183rd St. to 1191st St., $1,100,000. Est. $ 000. Lot 150 on Western Ave. tunnel, 1191st St. to 1199th St., $1,100,000. Est. $ 000. Lot 151 on Western Ave. tunnel, 1199th St. to 1207th St., $1,100,000. Est. $ 000. Lot 152 on Western Ave. tunnel, 1207th St. to 1215th St., $1,100,000. Est. $ 000. Lot 153 on Western Ave. tunnel, 1215th St. to 1223rd St., $1,100,000. Est. $ 000. Lot 154 on Western Ave. tunnel, 1223rd St. to 1231st St., $1,100,000. Est. $ 000. Lot 155 on Western Ave. tunnel, 1231st St. to 1239th St., $1,100,000. Est. $ 000. Lot 156 on Western Ave. tunnel, 1239th St. to 1247th St., $1,100,000. Est. $ 000. Lot 157 on Western Ave. tunnel, 1247th St. to 1255th St., $1,100,000. Est. $ 000. Lot 158 on Western Ave. tunnel, 1255th St. to 1263rd St., $1,100,000. Est. $ 000. Lot 159 on Western Ave. tunnel, 1263rd St. to 1271st St., $1,100,000. Est. $ 000. Lot 160 on Western Ave. tunnel, 1271st St. to 1279th St., $1,100,000. Est. $ 000. Lot 161 on Western Ave. tunnel, 1279th St. to 1287th St., $1,100,000. Est. $ 000. Lot 162 on Western Ave. tunnel, 1287th St. to 1295th St., $1,100,000. Est. $ 000. Lot 163 on Western Ave. tunnel, 1295th St. to 1303rd St., $1,100,000. Est. $ 000. Lot 164 on Western Ave. tunnel, 1303rd St. to 1311th St., $1,100,000. Est. $ 000. Lot 165 on Western Ave. tunnel, 1311th St. to 1319th St., $1,100,000. Est. $ 000. Lot 166 on Western Ave. tunnel, 1319th St. to 1327th St., $1,100,000. Est. $ 000. Lot 167 on Western Ave. tunnel, 1327th St. to 1335th St., $1,100,000. Est. $ 000. Lot 168 on Western Ave. tunnel, 1335th St. to 1343rd St., $1,100,000. Est. $ 000. Lot 169 on Western Ave. tunnel, 1343rd St. to 1351st St., $1,100,000. Est. $ 000. Lot 170 on Western Ave. tunnel, 1351st St. to 1359th St., $1,100,000. Est. $ 000. Lot 171 on Western Ave. tunnel, 1359th St. to 1367th St., $1,100,000. Est. $ 000. Lot 172 on Western Ave. tunnel, 1367th St. to 1375th St., $1,100,000. Est. $ 000. Lot 173 on Western Ave. tunnel, 1375th St. to 1383rd St., $1,100,000. Est. $ 000. Lot 174 on Western Ave. tunnel, 1383rd St. to 1391st St., $1,100,000. Est. $ 000. Lot 175 on Western Ave. tunnel, 1391st St. to 1399th St., $1,100,000. Est. $ 000. Lot 176 on Western Ave. tunnel, 1399th St. to 1407th St., $1,100,000. Est. $ 000. Lot 177 on Western Ave. tunnel, 1407th St. to 1415th St., $1,100,000. Est. $ 000. Lot 178 on Western Ave. tunnel, 1415th St. to 1423rd St., $1,100,000. Est. $ 000. Lot 179 on Western Ave. tunnel, 1423rd St. to 1431st St., $1,100,000. Est. $ 000. Lot 180 on Western Ave. tunnel, 1431st St. to 1439th St., $1,100,000. Est. $ 000. Lot 181 on Western Ave. tunnel, 1439th St. to 1447th St., $1,100,000. Est. $ 000. Lot 182 on Western Ave. tunnel, 1447th St. to 1455th St., $1,100,000. Est. $ 000. Lot 183 on Western Ave. tunnel, 1455th St. to 1463rd St., $1,100,000. Est. $ 000. Lot 184 on Western Ave. tunnel, 1463rd St. to 1471st St., $1,100,000. Est. $ 000. Lot 185 on Western Ave. tunnel, 1471st St. to 1479th St., $1,100,000. Est. $ 000. Lot 186 on Western Ave. tunnel, 1479th St. to 1487th St., $1,100,000. Est. $ 000. Lot 187 on Western Ave. tunnel, 1487th St. to 1495th St., $1,100,000. Est. $ 000. Lot 188 on Western Ave. tunnel, 1495th St. to 1503rd St., $1,100,000. Est. $ 000. Lot 189 on Western Ave. tunnel, 1503rd St. to 1511th St., $1,100,000. Est. $ 000. Lot 190 on Western Ave. tunnel, 1511th St. to 1519th St., $1,100,000. Est. $ 000. Lot 191 on Western Ave. tunnel, 1519th St. to 1527th St., $1,100,000. Est. $ 000. Lot 192 on Western Ave. tunnel, 1527th St. to 1535th St., $1,100,000. Est. $ 000. Lot 193 on Western Ave. tunnel, 1535th St. to 1543rd St., $1,100,000. Est. $ 000. Lot 194 on Western Ave. tunnel, 1543rd St. to 1551st St., $1,100,000. Est. $ 000. Lot 195 on Western Ave. tunnel, 1551st St. to 1559th St., $1,100,000. Est. $ 000. Lot 196 on Western Ave. tunnel, 1559th St. to 1567th St., $1,100,000. Est. $ 000. Lot 197 on Western Ave. tunnel, 1567th St. to 1575th St., $1,100,000. Est. $ 000. Lot 198 on Western Ave. tunnel, 1575th St. to 1583rd St., $1,100,000. Est. $ 000. Lot 199 on Western Ave. tunnel, 1583rd St. to 1591st St., $1,100,000. Est. $ 000. Lot 200 on Western Ave. tunnel, 1591st St. to 1599th St., $1,100,000. Est. $ 000. Lot 201 on Western Ave. tunnel, 1599th St. to 1607th St., $1,100,000. Est. $ 000. Lot 202 on Western Ave. tunnel, 1607th St. to 1615th St., $1,100,000. Est. $ 000. Lot 203 on Western Ave. tunnel, 1615th St. to 1623rd St., $1,100,000. Est. $ 000. Lot 204 on Western Ave. tunnel, 1623rd St. to 1631st St., $1,100,000. Est. $ 000. Lot 205 on Western Ave. tunnel, 1631st St. to 1639th St., $1,100,000. Est. $ 000. Lot 206 on Western Ave. tunnel, 1639th St. to 1647th St., $1,100,000. Est. $ 000. Lot 207 on Western Ave. tunnel, 1647th St. to 1655th St., $1,100,000. Est. $ 000. Lot 208 on Western Ave. tunnel, 1655th St. to 1663rd St., $1,100,000. Est. $ 000. Lot 209 on Western Ave. tunnel, 1663rd St. to 1671st St., $1,100,000. Est. $ 000. Lot 210 on Western Ave. tunnel, 1671st St. to 1679th St., $1,100,000. Est. $ 000. Lot 211 on Western Ave. tunnel, 1679th St. to 1687th St., $1,100,000. Est. $ 000. Lot 212 on Western Ave. tunnel, 1687th St. to 1695th St., $1,100,000. Est. $ 000. Lot 213 on Western Ave. tunnel, 1695th St. to 1703rd St., $1,100,000. Est. $ 000. Lot 214 on Western Ave. tunnel, 1703rd St. to 1711th St., $1,100,000. Est. $ 000. Lot 215 on Western Ave. tunnel, 1711th St. to 1719th St., $1,100,000. Est. $ 000. Lot 216 on Western Ave. tunnel, 1719th St. to 1727th St., $1,100,000. Est. $ 000. Lot 217 on Western Ave. tunnel, 1727th St. to 1735th St., $1,100,000. Est. $ 000. Lot 218 on Western Ave. tunnel, 1735th St. to 1743rd St., $1,100,000. Est. $ 000. Lot 219 on Western Ave. tunnel, 1743rd St. to 1751st St., $1,100,000. Est. $ 000. Lot 220 on Western Ave. tunnel, 1751st St. to 1759th St., $1,100,000. Est. $ 000. Lot 221 on Western Ave. tunnel, 1759th St. to 1767th St., $1,100,000. Est. $ 000. Lot 222 on Western Ave. tunnel, 1767th St. to 1775th St., $1,100,000. Est. $ 000. Lot 223 on Western Ave. tunnel, 1775th St. to 1783rd St., $1,100,000. Est. $ 000. Lot 224 on Western Ave. tunnel, 1783rd St. to 1791st St., $1,100,000. Est. $ 000. Lot 225 on Western Ave. tunnel, 1791st St. to 1799th St., $1,100,000. Est. $ 000. Lot 226 on Western Ave. tunnel, 1799th St. to 1807th St., $1,100,000. Est. $ 000. Lot 227 on Western Ave. tunnel, 1807th St. to 1815th St., $1,100,000. Est. $ 000. Lot 228 on Western Ave. tunnel, 1815th St. to 1823rd St., $1,100,000. Est. $ 000. Lot 229 on Western Ave. tunnel, 1823rd St. to 1831st St., $1,100,000. Est. $ 000. Lot 230 on Western Ave. tunnel, 1831st St. to 1839th St., $1,100,000. Est. $ 000. Lot 231 on Western Ave. tunnel, 1839th St. to 1847th St., $1,100,000. Est. $ 000. Lot 232 on Western Ave. tunnel, 1847th St. to 1855th St., $1,100,000. Est. $ 000. Lot 233 on Western Ave. tunnel, 1855th St. to 1863rd St., $1,100,000. Est. $ 000. Lot 234 on Western Ave. tunnel, 1863rd St. to 1871st St., $1,100,000. Est. $ 000. Lot 235 on Western Ave. tunnel, 1871st St. to 1879th St., $1,100,000. Est. $ 000. Lot 236 on Western Ave. tunnel, 1879th St. to 1887th St., $1,100,000. Est. $ 000. Lot 237 on Western Ave. tunnel, 1887th St. to 1895th St., $1,100,000. Est. $ 000. Lot 238 on Western Ave. tunnel, 1895th St. to 1903rd St., $1,100,000. Est. $ 000. Lot 239 on Western Ave. tunnel, 1903rd St. to 1911th St., $1,100,000. Est. $ 000. Lot 240 on Western Ave. tunnel, 1911th St. to 1919th St., $1,100,000. Est. $ 000. Lot 241 on Western Ave. tunnel, 1919th St. to 1927th St., $1,100,000. Est. $ 000. Lot 242 on Western Ave. tunnel, 1927th St. to 1935th St., $1,100,000. Est. $ 000. Lot 243 on Western Ave. tunnel, 1935th St. to 1943rd St., $1,100,000. Est. $ 000. Lot 244 on Western Ave. tunnel, 1943rd St. to 1951st St., $1,100,000. Est. $ 000. Lot 245 on Western Ave. tunnel, 1951st St. to 1959th St., $1,100,000. Est. $ 000. Lot 246 on Western Ave. tunnel, 1959th St. to 1967th St., $1,100,000. Est. $ 000. Lot 247 on Western Ave. tunnel, 1967th St. to 1975th St., $1,100,000. Est. $ 000. Lot 248 on Western Ave. tunnel, 1975th St. to 1983rd St., $1,100,000. Est. $ 000. Lot 249 on Western Ave. tunnel, 1983rd St. to 1991st St., $1,100,000. Est. $ 000. Lot 250 on Western Ave. tunnel, 1991st St. to 1999th St., $1,100,000. Est. $ 000. Lot 251 on Western Ave. tunnel, 1999th St. to 2007th St., $1,100,000. Est. $ 000. Lot 252 on Western Ave. tunnel, 2007th St. to 2015th St., $1,100,000. Est. $ 000. Lot 253 on Western Ave. tunnel, 2015th St. to 2023rd St., $1,100,000. Est. $ 000. Lot 254 on Western Ave. tunnel, 2023rd St. to 2031st St., $1,100,000. Est. $ 000. Lot 255 on Western Ave. tunnel, 2031st St. to 2039th St., $1,100,000. Est. $ 000. Lot 256 on Western Ave. tunnel, 2039th St. to 2047th St., $1,100,000. Est. $ 000. Lot 257 on Western Ave. tunnel, 2047th St. to 2055th St., $1,100,000. Est. $ 000. Lot 258 on Western Ave. tunnel, 2055th St. to 2063rd St., $1,100,000. Est. $ 000. Lot 259 on Western Ave. tunnel, 2063rd St. to 2071st St., $1,100,000. Est. $ 000. Lot 260 on Western Ave. tunnel, 2071st St. to 2079th St., $1,100,000. Est. $ 000. Lot 261 on Western Ave. tunnel, 2079th St. to 2087th St., $1,100,000. Est. $ 000. Lot 262 on Western Ave. tunnel, 2087th St. to 2095th St., $1,100,000. Est. $ 000. Lot 263 on Western Ave. tunnel, 2095th St. to 2103rd St., $1,100,000. Est. $ 000. Lot 264 on Western Ave. tunnel, 2103rd St. to 2111th St., $1,100,000. Est. $ 000. Lot 265 on Western Ave. tunnel, 2111th St. to 2119th St., $1,100,000. Est. $ 000. Lot 266 on Western Ave. tunnel, 2119th St. to 2127th St., $1,100,000. Est. $ 000. Lot 267 on Western Ave. tunnel, 2127th St. to 2135th St., $1,100,000. Est. $ 000. Lot 268 on Western Ave. tunnel, 2135th St. to 2143rd St., $1,100,000. Est. $ 000. Lot 269 on Western Ave. tunnel, 2143rd St. to 2151st St., $1,100,000. Est. $ 000. Lot 270 on Western Ave. tunnel, 2151st St. to 2159th St., $1,100,000. Est. $ 000. Lot 271 on Western Ave. tunnel, 2159th St. to 2167th St., $1,100,000. Est. $ 000. Lot 272 on Western Ave. tunnel, 2167th St. to 2175th St., $1,100,000. Est. $ 000. Lot 273 on Western Ave. tunnel, 2175th St. to 2183rd St., $1,100,000. Est. $ 000. Lot 274 on Western Ave. tunnel, 2183rd St. to 2191st St., $1,100,000. Est. $ 000. Lot 275 on Western Ave. tunnel, 2191st St. to 2199th St., $1,100,000. Est. $ 000. Lot 276 on Western Ave. tunnel, 2199th St. to 2207th St., $1,100,000. Est. $ 000. Lot 277 on Western Ave. tunnel, 2207th St. to 2215th St., $1,100,000. Est. $ 000. Lot 278 on Western Ave. tunnel, 2215th St. to 2223rd St., $1,100,000. Est. $ 000. Lot 279 on Western Ave. tunnel, 2223rd St. to 2231st St., $1,100,000. Est. $ 000. Lot 280 on Western Ave. tunnel, 2231st St. to 2239th St., $1,100,000. Est. $ 000. Lot 281 on Western Ave. tunnel, 2239th St. to 2247th St., $1,100,000. Est. $ 000. Lot 282 on Western Ave. tunnel, 2247th St. to 2255th St., $1,100,000. Est. $ 000. Lot 283 on Western Ave. tunnel, 2255th St. to 2263rd St., $1,100,000. Est. $ 000. Lot 284 on Western Ave. tunnel, 2263rd St. to 2271st St., $1,100,000. Est. $ 000. Lot 285 on Western Ave. tunnel, 2271st St. to 2279th St., $1,100,000. Est. $ 000. Lot 286 on Western Ave. tunnel, 2279th St. to 2287th St., $1,100,000. Est. $ 000. Lot 287 on Western Ave. tunnel, 2287th St. to 2295th St., $1,100,000. Est. $ 000. Lot 288 on Western Ave. tunnel, 2295th St. to 2303rd St., $1,100,000. Est. $ 000. Lot 289 on Western Ave. tunnel, 2303rd St. to 2311th St., $1,100,000. Est. $ 000. Lot 290 on Western Ave. tunnel, 2311th St. to 2319th St., $1,100,000. Est. $ 000. Lot 291 on Western Ave. tunnel, 2319th St. to 2327th St., $1,100,000. Est. $ 000. Lot 292 on Western Ave. tunnel, 2327th St. to 2335th St., $1,100,000. Est. $ 000. Lot 293 on Western Ave. tunnel, 2335th St. to 2343rd St., $1,100,000. Est. $ 000. Lot 294 on Western Ave. tunnel, 2343rd St. to 2351st St., $1,100,000. Est. $ 000. Lot 295 on Western Ave. tunnel, 2351st St. to 2359th St., $1,100,000. Est. $ 000. Lot 296 on Western Ave. tunnel, 2359th St. to 2367th St., $1,100,000. Est. $ 000. Lot 297 on Western Ave. tunnel, 2367th St. to 2375th St., $1,100,000. Est. $ 000. Lot 298 on Western Ave. tunnel, 2375th St. to 2383rd St., $1,100,000. Est. $ 000. Lot 299 on Western Ave. tunnel, 2383rd St. to 2391st St., $1,100,000. Est. $ 000. Lot 300 on Western Ave. tunnel, 2391st St. to 2399th St., $1,100,000. Est. $ 000. Lot 301 on Western Ave. tunnel, 2399th St. to 2407th St., $1,100,000. Est. $ 000. Lot 302 on Western Ave. tunnel, 2407th St. to 2415th St., $1,100,000. Est. $ 000. Lot 303 on Western Ave. tunnel, 2415th St. to 2423rd St., $1,100,000. Est. $ 000. Lot 304 on Western Ave. tunnel, 2423rd St. to 2431st St., $1,100,000. Est. $ 000. Lot 305 on Western Ave. tunnel, 2431st St. to 2439th St., $1,100,000. Est. $ 000. Lot 306 on Western Ave. tunnel, 2439th St. to 2447th St., $1,100,000. Est. $ 000. Lot 307 on Western Ave. tunnel, 2447th St. to 2455th St., $1,100,000. Est. $ 000. Lot 308 on Western Ave. tunnel, 2455th St. to 2463rd St., $1,100,000. Est. $ 000. Lot 309 on Western Ave. tunnel, 2463rd St. to 2471st St., $1,100,000. Est. $ 000. Lot 310 on Western Ave. tunnel, 2471st St. to 2479th St., $1,100,000. Est. $ 000. Lot 311 on Western Ave. tunnel, 2479th St. to 2487th St., $1,100,000. Est. $ 000. Lot 312 on Western Ave. tunnel, 2487th St. to 2495th St., $1,100,000. Est. $ 000. Lot 313 on Western Ave. tunnel, 2495th St. to 2503rd St., $1,100,000. Est. $ 000. Lot 314 on Western Ave. tunnel, 2503rd St. to 2511th St., $1,100,000. Est. $ 000. Lot 315 on Western Ave. tunnel, 2

10, Washington Co., 3.6 mi, Rts. 30 and 61, Wakulla Co., $70,784. 6/12.

La.—Harvey—Jefferson Parish Police Jury, Gretna, June 26, paving streets, from Martin Constr. Co., 8734 Plum St., New Orleans, $90,223.

Massachusetts—Dpt. P. Wks., Boston, June 13, highway and bridge, Mohawk Trail, Greenfield, from Kelliher Corp., Turner Falls, $437,321. CD 6/5.

Nebraska—State Dpt. Roads & Irrigation, Lincoln, June 30, 4 mi. U.S. 6, from 24 to 26 sts., in Omaha incl. paving, from Peter Kiewit Sons Co., Omaha Natl. Bank Bldg., $64,164. CD 6/12.

▲New York—Bureau Contracts & Accounts, Albany, June 20, from Agar & Booth, Watertown, b. conc.-wid. and resurf. 5 mi. Route 26, exten. north-southward from intersection with Route 12 to point approx. 1 mi. southeast of village of Hounsfield, incl. 1.45 mi. village of Turin, Lewis Co., $114,222, est. $150,000***from Jess F. Howe, Sidney Center, reconstruct with 22 ft. wide bit. macad. 0.26 mi. Route 178, near Scottsville, incl. 25 ft. span concrete slab bridge, 60 ft. span I-beam girder and reinforced gratings, drainage, reconstruction of new location with 22 ft. wide bit. macad. 0.35 mi. Route 52, exten. southward from its intersection with Route 52 A, 1.2 mi. south of Swan Beach village, etc., Sullivan Co., $220,841, est. $268,000***from County Asphalt, Inc., 209 Main St., Tarrytown, b. conc. resurf. incl. some widen. 14 mi. 4 sections, Route 17 between Delaware-Sullivan Co. line and Monticello, Sullivan Co., $371,-820, est. $440,000.

from Clinton—Texas & Piper, Inc., 80 Trinity Pl., New York, construct elevated sect. of Major Deegan Expressway, 0.36 mi. exten. from point near Bronx Terminal Market northward across the New York Central R.R. tracks, to approaches to Macombs Dam bridge, incl. construction steel viaduct structure, 116 ft. span plate girder bridge, paving twin 30 ft. concrete roadways and necessary demolition, grading, drainage and utilities, Bronx Co., $4,979,447, est. $5,214,000***from Pioner & McClane Corp., 33 W. 42 St., New York, construct High-bridge Interchange on Cross Bronx Expressway from Amsterdam Ave. eastward for 0.26 mi. incl. 20 span 1,340 ft. main viaduct, 4 span 400 ft. concrete arch bridge, two 53 ft. span rigid frame concrete bridge, concrete retaining wall, pedestrian interpass, 0.28 mi. connec. paving, etc., New York Co., $3,163,476, est. $3,264,000***from Mac Arthur Construction Corp., 33 St. Lawrence St., Flushing, paving with 7 in. 6 in. and 5 in. concrete arteries separated by 4 in. median strip of precast concrete, Van Wyck Expressway exten. from 47 Ave. to Archer Ave., Queens Boro, Queens Co., $243,160, est. $305,000.

from Zara Contr. Co., Inc., 51 Prospect Ave., Hewlett, construct with 25 ft. wide concrete arteries, 4.76 mi. Sunrise State Parkway exten. from point near Southern State Parkway southward to Sagtikos State Parkway, including interchange, paving, bridges and underpasses, grade separation structures, Suffolk Co., $1,581,184, est. $1,729,000***from E. J. Delia & Sons Concrete Corp., New Hartford, reconstruct with 22 ft. conc. pavement 4.89 mi. Route 162 exten. southeastward from point approx. 1 mi. southeast of its junction with Route 5, to point approx. 3,500 ft. southeast of the hamlet of Rural Grove, etc., Montgomery Co., $543,426, est. $613,000***from Warren Bros., Route Cat 28, Memorial Dr., Cambridge, Mass., widen, b. conc. resurf. 4.10 mi. Route 31 exten. northeastward from point near Hannibal, village of Sterling to Route 34 in village of Lyons, Wayne Co., $135,269, est. $173,-000.

width, to 24 ft. and b. conc. resurf. 6.64 mi. route-ft. exten. from village of Liverpool northeastward to Oneida River, Onondaga Co., $199,950, est. $242,-000. new, 4.70 mi. Route 28 in 2 sections with 22 ft. conc. pavement, 1.7 mi. exten. northeastward from exten. northeast from Old Forge and the other 2.22 mi. exten. southeastward from Eagle Bay, Herkimer Co., $97,155, est. $123,000***from Imperial Constr. Corp., reconstruct with 24 ft. wide b. conc. pavement 1.94 mi. Route 17, exten. southeastward from intersection with Route 36 Portville to point near Cattaraugus-Allegany Co. line, incl. necessary grading, drainage structure 29 ft. span concrete slab bridge, Cattaraugus and Allegany Counties, $179,-977 est. $207,000***from the Kelloom & Shaffer Co., Schenectady, widen to 22 ft. b. conc. resurf. 3.2 mi. Route 346, exten. southward from Schenectady Co. line to intersection with Route 2 at Alplaus, etc., $17,646, est. $14,000***from Louis Mavrinchik, 36 State St., Albany, widen to variable width and b. conc. resurf. 0.07 mi. Route 9 B at 2 locations, one exten. from intersection with Route 9 northeastward for 1.7 mi. to Colpoysville, second exten. from intersection with Route 9 southward through village of Route 9 for the 2.97 mi. to the city limits of Albany at intersection with Route 13, Clinton Co., $88,536, est. $103,000, CD 6/27.

Pennsylvania—State Hwy. Dpt., Harrisburg, June 23, [illegible] Co., [illegible] with [illegible] conc. pavement, [illegible] Route [illegible] exten. [illegible] with [illegible] Route [illegible] exten. [illegible] with [illegible] Route [illegible] exten. [illegible] with

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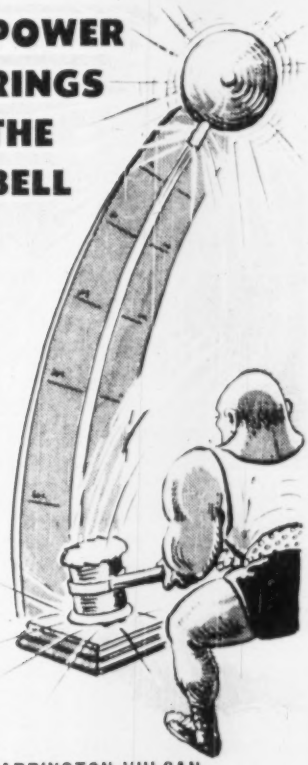

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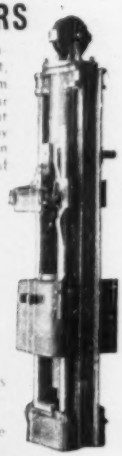

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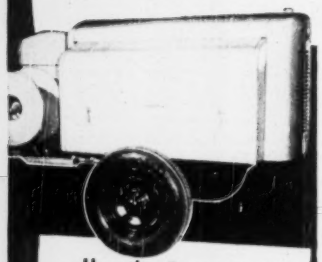

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Camp Maxey, Austin, June 28: hangar and maintenance shop, renabilitation, Sec. 2, Tex., 41,224; 5-32; from Argo Constr. Co., 4032 Rusk St., $54,965.

PUBLIC BUILDINGS

BIDS ASKED

N. Y., Flushing—HOUSING—B.A. 7/12—New York City Housing Auth., 63 Park Row, New York: Zone 1, 4 fams., appurtenances, for Flushing Houses, Sect. 1 (Rev.), Nw. Northern Blvd., Parsons Blvd. and area bounded by United States & Flushing Rivers, Whitestone Expressway, Whitestone Expressway Service Rd. and Francis Lewis Blvd. Plans at 2d floor, $1.

▲ N. J., Paterson—HOUSING—B.A. 7/12—Paterson Housing Auth., 219 Ward St., Paterson: 2 sets, 2-story, $3,146,000; Kelly & Gruzen, 521 Fifth Ave., New York, N. Y.; plans at 521 Fifth Ave., New York, N. Y., $100.

S. C., Neaberry—BOILER HOUSE, etc.—B.A. 7/21—Newberry Cty., Newberry Memorial Hosp., boiler house, laundry addn.; plans deposit $25; James C. Hemphill, Greenwood, archt.

La., Gretna—SCHOOLS—B.A. 7/12—Jefferson Parish School Bd., 114 Huey P. Long Ave., 1 story, brick & concrete addns. to Westwego School, and to Westwego 2-story frame negro school addns., repairs in Harvey, 1-story frame addn. & repairs at Gretna; Dist. School addns. in Marrero; CD 5/24.

Mass., Springfield—HALL RECORDS—B.A. 7/12—Commr. Handicapped Children, Wm. Bray, chm., County Comrs., 95 Elm St.; 2nd story, brick, steel, granite, Hall of Records addn., Elm St., $450,000; Morris W. Mallory, 218 Dwight St., archt.

N. Y., Brooklyn—SCHOOL—B.A. 7/12—Supt. School Bldgs., Design & Constr., 49 Flatbush Ave. extension, Zone 1, general construction, plumbing and drainage, heating and ventilating, electrical work, lighting fixtures for P. S. 211, Avenue T and E. 64 to E. 65 Sts.; Plans deposit $4 general constr.; $6 each others.

N. Y., St. George—LIBRARY—B.A. 7/12—Dept. Public Wks., Municipal Bldg., New York, Zone 7, general contract; piping for heating, electrical work and lighting fixtures for extension to St. George Regional Branch Library addn., Hyatt Ave. at Hyatt St., Richmond; Boller Plans deposit $10; CD 10/18-48.

N. C., Durham—HEATING PLANT—B.A. 7/13—North Carolina College for Negroes, Alphonso Elder, pres., Durham; general contract piping, electrical work, plumbing, Central Heating Plant and underground distrib. syst.; Plans deposit $20 general and piping, and $10 each plumbing, electrical work; C. E. Weaver & Co., Capital Club Bldg., Raleigh, engrs.

▲ Colo., Denver—HOUSING—B.A. 7/13—H. A. Gallagher, Dir. Housing Auth., 2100 Stout St., Denver; $1,000,000; Plans deposit $25; John F. Hunt & Hegner, Colorado Bldg., Denver; CD 12/26.

▲ O., Cleveland—SERVICE—B.A. 7/13—City Hall, 2 story, patient, brick service bldg. addn. to city hospital, $2,500,000; Plans deposit $50; Hubbell, Smith & Reed, 1746 E. 21st St., Cleveland; CD 11/2.

Tenn., Pulaski—SCHOOL—B.A. About 7/17—Giles Co. Board of Education, Pulaski; $500,000; Howard, Hickerson & Jordan, 2411 3 Ave. S., Nashville, archts.

▲ N. J., Linden—HOUSING—B.A. 7/13—Linden Housing Auth., Linden; $1,000,000; Kelly & Gruzen, 521 Fifth Ave., New York, N. Y., archts.; CD 8/24.

▲ Colo., Denver—HOUSING—B.A. 7/13—H. A. Gallagher, Dir. Housing Auth., 2100 Stout St., Denver; 100 units, $1,000,000; Plans deposit $25; John F. Hunt & Hegner, Colorado Bldg., Denver; CD 12/26.

† N. M., Shiprock—POWER PLANT—B.A. 7/26—Bureau Indian Affairs, Shiprock; power plant, 14 and 15 Wash. Bldg., Washington, D. C.; Reuben and Parker, 1 Wash. Bldg., Washington, D. C., archts. & engrs.

▲ Tex., San Antonio—HOSPITAL—B.A. 7/26—Bexar County Hospital Dist., 1 Main Plaza, San Antonio; Robert M. Green, 1 Main Plaza, San Antonio, archt. & engr.

▲ N. J., Woodbridge—HOUSING—B.A. 7/13—Housing Auth., Woodbridge; Kelly & Gruzen, 521 Fifth Ave., New York, N. Y., archts.

LOW BIDDERS

▲ Calif., Los Angeles—SCHOOL—$1,929,000—Los Angeles City Bd. of Education, 450 N. Grand Ave., Los Angeles; 2 story, brick, concrete & steel, Fremont High School addn.; Allison & Allison, 3580 Wilshire Blvd., Los Angeles, archts.

▲ Colo., Denver—HOUSING—$1,749,000—Denver Housing Auth., 2100 Stout St., Denver; 300 units; Saunders & Quigg, 1700 Broadway, Denver, archts.

† Ga., Milledgeville—HOSPITAL—$214,936—Georgia State Board of Public Welfare, Atlanta; Georgia State Sanitarium addn.; Hentz, Reid & Adler, Atlanta, archts.

Kentucky—HOSPITAL—$366,962—Kentucky Dept. of Public Welfare, Frankfort; Kentucky Children's Hospital addn., Louisville; Mutchler & Mutchler, Louisville, archts.

Mo., Fort Leonard Wood—$259,000—U. S. Army Engr. Dist., Kansas City, Mo.; 2 warehouses; Hoit, Price & Barnes, Kansas City, archts.

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* Completely simplifies design and construction methods. Permits greater flexibility and provides many cost cutting advantages.

SPECIAL STEEL GRILLAGES

. . . eliminates usual flared column cups, drop panels or beams. They can be used with Structural steel, steel pipe of Reinforced concrete columns.

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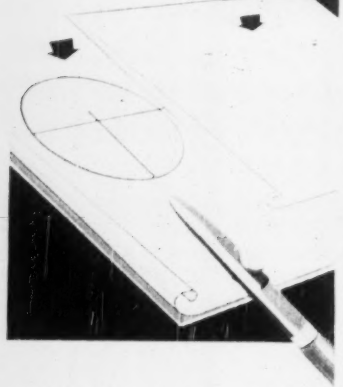

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CONTRACTS AWARDED

COMMERCIAL BUILDINGS

BIDS ASKED

SOON LETS CONTRACT

LOW BIDDERS

(Continued on page 82)

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WRITE for complete data or quotation.

USF
UNITED STEEL FABRICATORS, INC.
WOOSTER, OHIO

(Continued from page 80)

CONTRACTS AWARDED

▲ Ala., Mobile—APARTMENT UNITS—Highland Terrace Apartments, Inc., c/o R. C. Jeffers, 2010 Second Ave. N., Birmingham, Ala., apartment units. Owner builds. $3,500,000.

Calif., Los Angeles—APARTMENT—Verdugo Mesa Corp., 3150 E. Wilson Ave., Pasadena, 16 stucco apartments, to Fenwick & Tompkins, 3340 E. Wilson Ave., Glendale. Approx. $64,000. Owner builds. 3340 E. Wilson Ave., Glendale. CD 11/7.

Calif., Norwalk—APARTMENTS—Harry Foster, Jr., Inc., Santa Monica, Calif., 24 stucco dwellings, 12 duplexes, 4 quadruplexes, 2 stucco awnings and Crestwood Ave., owner builds. $404,210. Fred Duncan, 4823 Lakewood Blvd., Norwalk, archt.

▲ Calif., Palo Alto—RESIDENCES—Guernsey Builders, [illegible] Alma St., Palo Alto, Calif., 10 residences and [illegible] Alma St., owner builds, $4,000,000. [illegible] Stream Line Subdivision, Palo Alto, Calif. CD 4/14.

▲ Calif., Whittier—DWELLINGS—Nasr Diamond Co., 739 S. Highland Ave., Los Angeles, 216 multi-family units, Lemoyne Cir., Cresswell, Lemoyne and Toreka Sts., to Hasler Country Co., 739 S. Highland Ave., Los Angeles. Approx. $1,510,960.

Calif., Whittier—DWELLINGS—Harold E. Williams Co., 1555 Wilcox Blvd., Los Angeles, 97 dwellings in Whittier. Owner builds. $679,000. Edward H. Fickett, 1555 Wilcox Blvd., Los Angeles, archts.

D. C., Wash.—SEMINARY—Ukrainian Greek Catholic Diocese, c/o contractor, 3 story, stone, main bldg. and 1 story altar and small chapel for Josaphatic Ukrainian Greek Catholic Seminary, Jack F. Nebel Co., 2142 - 15th St., N. W., Washington, D. C., Jastremsky, 19 W. 44th St., New York, N. Y., archt.

Fla., Miami—HOMES—L. & S. Corp., c/o contractor, 132 homes, to Babcock & Largent Co., 3014 Coral Way, Approx. $750,000.

Fla., North Miami—RESIDENTIAL DEVELOPMENT—Suburban Homes, Inc., c/o Norman A. Giller, archt., 1539 Washington Ave., Miami Beach, original residential development. Owner builds. Approx. $250,000.

▲ Fla., Tampa—HOMES—Brinker Development Co., c/o Roy R. Brinker, 2107 E. Livingston St., Tampa, 139 homes. Owner builds. $1,300,000.

Ill., Evanston—SCHOOL, etc.—National Foundation of Music Camps, Central Y.M.C.A. and Ashland, 2 story, brick, for Northwestern U., 1822 Sheridan Rd., Evanston, Ill., to Bulley & Andrews, 1 N. LaSalle St., Chicago. Zone e. $250,000. Awarded [illegible] CD 4/14.

Ky., Louisville—CHURCH and SCHOOL—Arch. Bishop [illegible] St. Sister house and church and school addition to A. J. Schneider Const. Co., 2 St. Rd., $302,000. Bids 6/7, awarded 6/13. CD 4/14.

▲ Md., Upper Marlboro—APARTMENTS—etc.—Albert [illegible] & Louis Gruber, [illegible] East 42 St., N. Y., [illegible] Wash., D. C., [illegible] 1500 and brick garden-type apartment, [illegible] Marlboro, [illegible] Indian Head Rd., [illegible] south of Wash. [illegible] Zone 20. $17,000,000-$20,000,000.

Mass., Somerville—APARTMENT—St. Polycarp's [illegible] Temple St., [illegible] 3 family, [illegible] Parochial [illegible] Myrtle Ave., [illegible] Flatbush, 269 [illegible] Approx. $250,000. CD 2/17.

Mass., Springfield—DORMITORY—Springfield College, [illegible] M. Lamont Gym, [illegible] story, brick, [illegible] Penney [illegible] $250,000. CD [illegible] 2/27.

Miss., Corinth—[illegible] Corinth, [illegible] $500,000.

Miss., Natchez—[illegible] Natchez, [illegible] $300,000.

Mo., Kansas City—[illegible] Kansas City, [illegible] $800,000.

▲ Mo., Kansas City—[illegible] Kansas City, [illegible] $1,500,000 entry [illegible]

Mo., Springfield—[illegible] Springfield, [illegible] $54,100.

Neb., Columbus—[illegible] Columbus, [illegible] Convent and social [illegible] $277,950.

▲ N. Y., New York—[illegible] story apartment [illegible] bounded [illegible] $9,000,000.

[illegible] Brooklyn—[illegible] Brooklyn, [illegible] story, [illegible] $250,000.

Tenn., Memphis—CHURCH—Evergreen Presbyterian Church, c/o contractor, church, to E. & R. Const. Co., 983 Shrine Bldg. Approx. $400,000.

Tex., Dallas—SHOPPING CENTER—W. W. Caruth, Jr., c/o Caruth Corp., 5803 Greenville Ave., construct unit of Group 2 shopping center, facing Inwood St., own forces. $275,000. Walter W. Ahlschlager and C. M. Smith, 214 S. St. Paul St., archts. and engrs.

Tex., Dallas—DWELLINGS—Verhun & James Smith, Liberty Bank Bldg., addn., dwellings south of Wynnewood Addition. Owner builds. $300,000. CD 11/7.

Que., Hull—DWELLINGS—Lotissement de Hull, Inc., 339 Montcalm St., 75 dwellings. Owner builds. $350,000.

INDUSTRIAL BUILDINGS

BIDS ASKED

Ga., Thomaston—WAREHOUSE, etc.—B.A. 7/12—Upson County Electric Membership Corp., warehouse and office. Extended date. Southern Eng. Co., 1000 Crescent Ave., N. E., Atlanta, archts. CD 6/16.

Ga., Eastman—WAREHOUSE, etc.—B.A. 7/17—Ocmulgee Electric Membership Corp., Eastman, warehouse and office. Southern Eng. Co., 1000 Crescent Ave., N. E., Atlanta, archt. CD 6/16.

Ill., Evanston—PLANT, etc.—Bids Asked—Standard Rate & Data Service, Lyons and Ridge Sts., 2 story, limestone, printing plant and office. $450,000. Maher & Mcurea, 626 Grove St., archts. CD 1/3.

SOON LETS CONTRACT

Md., Baltimore—AUTO SERVICE—Fay's Dealer Motor Co., 3420 Reisterstown Rd., soon lets contract 1 story, 120x130 ft. brick, concrete steel auto service bldg. Plans deposit $20. Lawrence B. Rutter, 2415 Lyons Falls Parkway, archt.

▲ O., Cuyahoga Heights—PARTS DISTRIBUTION WAREHOUSE—Ford Motor Co., 3000 Schaefer Rd., Dearborn, Mich., soon lets contract 1 story, 245x640 ft., brick, also 2 story parts depot, warehouse Exterior Ave., and Willow Freeway. $1,500,000. F. A. Faerbrother & Co., 345 New Center Bldg., Detroit, Mich., archts. Albert Kahn Assoc. Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., consult. engr.

Tex., Houston—WAREHOUSE—Big Three Warehouse Co., c/o Irving Klein & Assoc., archts., 1317 Austin St., soon lets contract 96x132 ft. masonry, steel type, steel warehouse, concrete slab fill, Yale Ave. and 10 St. $85,000.

Ont., Paris—FACTORY—W. G. Stanton, 3 Vic. St., Paris, soon lets contract 60x80 ft. concrete, structural steel factory, for Kaumasrapt, Ltd., 3 Vic. St., Paris. $100,000. R. M. Hall, 9 Cathay St., Galt, archt.

LOW BIDDERS

S. C., Clover—MILL—The American Thread Co., Clover, June 13 mi. S.W. from A. K. Adams, 542 Plum St., N.W., Atlanta, Ga., $220,727. CD 6/7.

Tex., Fort Worth—WAREHOUSE—Universal Mills, Inc., 1701 Oakland Stockyards, Riverside St., 100x128, reinforced, grain storage warehouse, Kings Hy., from Thomas S. Byrne, Inc., Fort Worth Nat. Bank Bldg. $70,000. C. M. Davis, Dan Waggoner Bldg., archt.

CONTRACTS AWARDED

▲ Colo., Grand Junction—MILL—Climax Uranium Co., Grand Junction, designer and plants 50 to 100-ton ore mill, 6 mi. from Uravan. Uranium Ore Mills to Stearns-Roger Mfg. Co., 1720 California St., Denver. Approx. $1,000,000.

Ga., Atlanta—PLANT, etc.—Swift & Co., Union Stockyards, Chicago, 9 story fertilizer plant and feed factory, dry store. $140,000. CD 11/15.

Ill., Chicago—PLANT—H. Metal Products Co., 4027 W. Lake St., Zone 24, 115x124 ft. plant, to Emil Rozwatka, 5314 W. 25 St., Cicero. $68,000. Awarded 6/15. A. J. Smithson, 308 Harris St., Hinsdale, archt.

▲ Kan., Lawrence—FACTORY—Westvaco Chemical Corp., 405 Lexington Ave., New York City, N. Y., to Lloyd Machinery & Chemical Corp., of San Jose, Calif., chemical factory, to Bell-Cors Corp., 200 Bush St., San Francisco, Calif. $3,500,000.

Ky., Louisville—PLANT—Ford Motor Co., 3600 Schaefer Rd., Dearborn, Mich., lets plant addn., to F. W. Dame, Co., 118 N. 5 St. $117,500. Bids 6/5, awarded 6/10. CD 6/2.

Ky., Louisville—WAREHOUSE—Glenmore Distilleries, Owensboro, concrete footings, sheet metal siding, warehouse, Yellowstone Distillery, to Daniel Construction Co., Baxter and Highland Sts., Zone 4. $123,000. Bids 6/12, awarded 6/14.

Ky., Louisville—PLANT—Union Carbide Co., 30 East 42nd St., New York, N. Y., plant to [illegible] waste gas [illegible] own forces. $500,000.

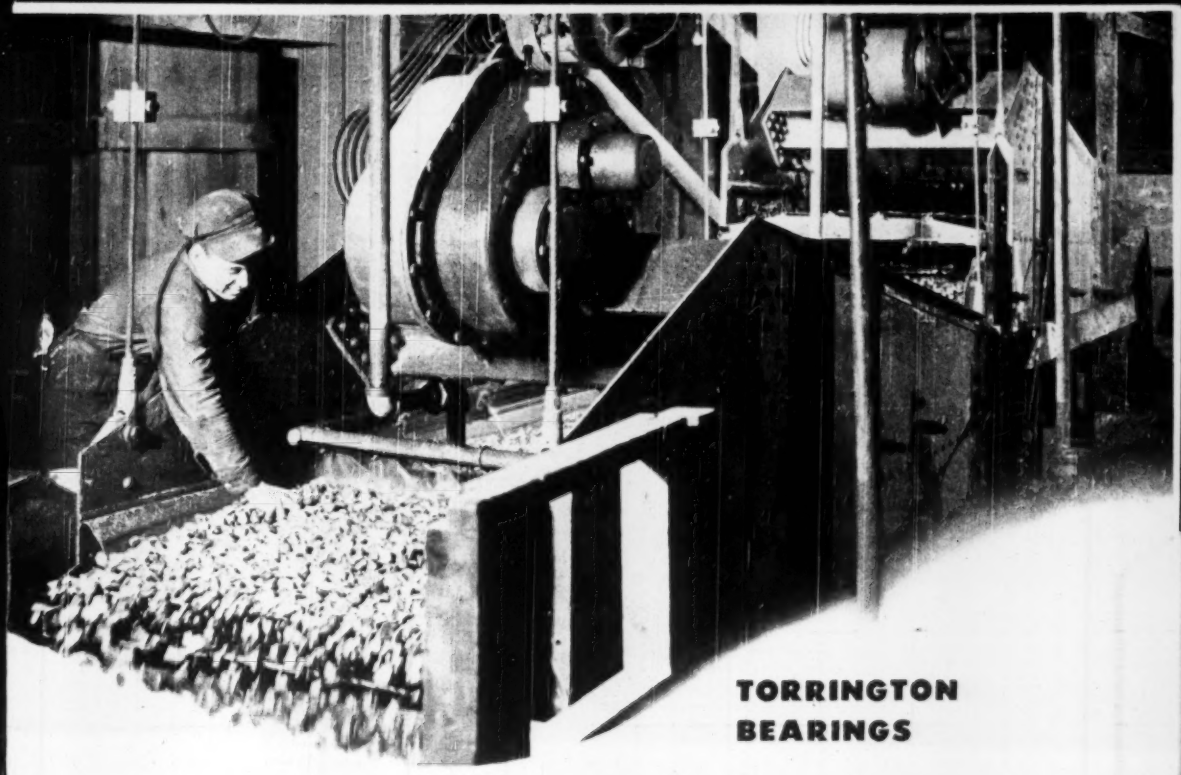
La., Baton Rouge—PLANT and OFFICE—Morning Treat Coffee Co., c/o contractor, plant and office, to Robert Thibodeaux, P. O. Box 687, Zone 1. Approx. $68,000.

La., Lafayette—GARAGE—Dixie Tow Rentz Co., c/o contractor, auto garage for Evangeline Auto, to Horace B. Rickerd, P. O. [illegible] 218. Approx. $68,000.

Neb., Omaha—GRAIN ELEVATOR—Farmers Union Cooperative Elevator Federation, 206 Grains Grain Exchange, grain elevator, to Thompson Constr. Co., 1215 Jones St., Approx. $325,000.

O., Cleveland—GARAGE—[illegible] Chevrolet-Cad. Div. General Motors, General Motors Bldg., Detroit, Mich., 1 story, 150x239 ft., brick, block garage and [illegible]

(Continued on page 85)



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Vibrating screens give a design engineer a tough problem in bearing selection. Satisfied with nothing less than the best screen performance, Allis-Chalmers engineers have devoted years of research in close cooperation with bearing manufacturers to develop precision bearings ideally suited to each specific screen application.

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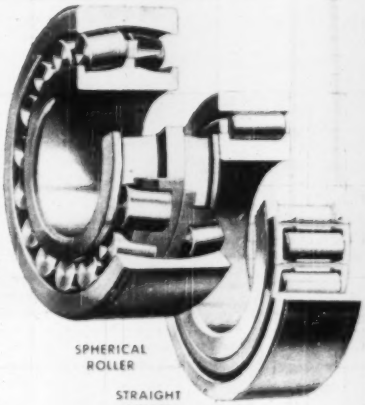
It may pay you, too, to consult our engineers' special knowledge of all major bearing types in connection with your friction problems.



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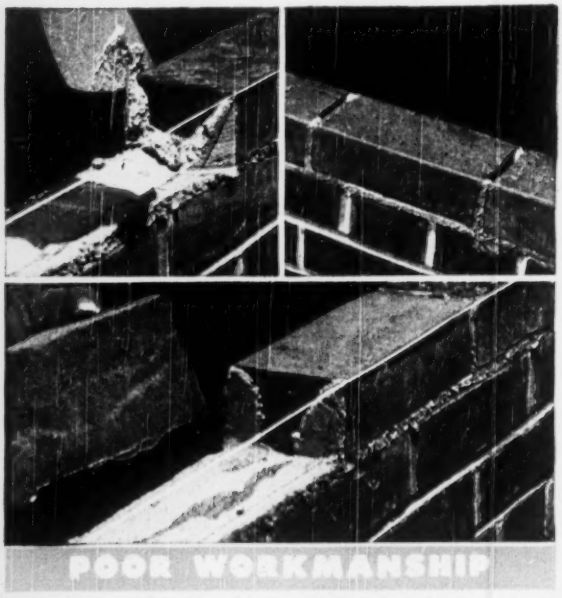
GOOD BRICKWORK = GOOD DESIGN + GOOD WORKMANSHIP + GOOD MATERIALS

Plenty of mortar should be thrown on the end of the brick to be placed. The brick should then be pushed into place, so that mortar oozes out of the head joint.



When dabs of mortar are spotted on the corners of the brick, the mortar does not completely fill the head joint, and voids are still left.

FULL HEAD JOINTS, WITH BRIXMENT HELP PREVENT LEAKY WALLS

WE SUGGEST THAT—

All head joints in both face brick and back-up work should be completely filled with mortar. If head joints are not completely filled, water may penetrate to the inside of the wall through openings in the joints. *Dabs of mortar spotted on the corners of the brick are not nearly enough to fill the joints.*

Take a look at the two examples shown at the left, and you'll instantly see why full head joints are an essential part of *good workmanship* in bricklaying.

No mortar material alone, not even Brixment, can make watertight masonry walls, so long as open crevices and pockets are left in the mortar joints.

Brixment mortar makes it far easier for the bricklayer to do good work. It is smooth and plastic—so soft and workable that the bricklayer can use enough mortar to fill the joint, and still "place" the brick easily and accurately to the line.

Brixment mortar has greater plasticity, higher water-retaining capacity and bonding quality, greater resistance to freezing and thawing, and freedom from efflorescence. Because of this *combination* of advantages, Brixment is the leading masonry cement on the market.

LOUISVILLE CEMENT COMPANY, Incorporated, LOUISVILLE, KENTUCKY

(Continued from page 82)

Tenn., Knoxville, WAREHOUSE, ... Approx. $75,000

Tenn., Memphis, PLANT, ... Approx. $100,000

Tex., Amarillo, WAREHOUSE, ... Approx. $93,125

Wis., Milwaukee, PAPER FACTORY, ... $140,000

Alta., Calgary, PLANT, ... $125,000

Alta., Edmonton, GARAGE, ... Approx. $70,000

Ont., Chemong, DIAMOND DRILLING, ... Approx. $70,000

Ont., Toronto, FACTORY, ... Approx. $260,000

Que., Cutremont, GARAGE, ... Approx. $75,000

Que., Roxyn, PLANT, ... Approx. $75,000

Que., St. Hyacinthe, FACTORY, ... $75,000

UNCLASSIFIED

BIDS ASKED

Miss., Baldwyn, NATURAL GAS SYSTEM, ... $25,000

O., Wooster, GAS EXPERIMENT STATION, ...

N. Y., Jones Beach, MARINE STADIUM, ...

N. Y., Albany, SITE IMPROVEMENTS, ...

LOW BIDDERS

Ala., Sheffield, NATURAL GAS DISTRIBUTION SYSTEM, ... $402,691

Ala., Tuscumbia, NATURAL GAS DISTRIBUTION SYSTEM, ... $282,530

Calif., Los Angeles, GARAGE, ... $782,900

Md., Edgewood, AIR CONDITIONING, ... $79,823

Montana, STEEL DATA HIGHWAY BRIDGE, ...

Pennsylvania, TRUCK DUMPING, ... $54,775.

Texas, FARM-TO-MARKET HIGHWAY, ... $70,244

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Saxe Units place in position and securely hold together structural parts to be welded.

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Tamps earth to as high as 123% density by Proctor Test — with the effect of a 10-ton roller — yet weighs only 240 lb. Works where heavy equipment can't.

One builder says two men do more and better work in 1½ hours with a Wayer Impactor than in 4 hours with other types of tampers. Highway engineers say it tamped more earth fill in 2 days than other tampers could in 2 weeks — and to 95% density! After using it on fill for 300 houses, a contractor bought another just for standby.

Wayer Impactor transports on any light truck — goes through doorways, into basements and excavations. Its tamping plate strikes 1900 blows of 1250 foot pounds impact per minute while it covers 45 to 60 square feet. Insures uniform, dense compaction. Works right up to walls, drains, curbs, etc. Great, too, for bituminous and dry concrete pavement patching. Gasoline engine powered, one man operated. *Write for Bulletin 25-0* and full information.

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† Wash., Seattle—(CPFF) [illegible] 6735 E. Marginal Way, Zone 8, Alki to Jefferson Cons. Sch. North and south spurs, Pier 36 and north and west spurs, Pier 36 to Alki Pt. Alki Pt. Boulevard, deck, seawall addn. and Road Pier Spurs (no. ENG. 45-108-54.2) from Lorentz Bros., Colman Bldg., Zone 4. $654,218. (cf. 3/47, 277) CD 4/50.

CONTRACTS AWARDED

Calif., East Los Angeles—STADIUM—Los Angeles Rd. Elec., 1425 S. San Pedro St., completing Stadium A at East Los Angeles Junior College to Zeis Constr. Co., 1837 N. Cole St., Los Angeles. $637,500. Bids 6/12, awarded 6/21. CD 6/30, 7/49.

Fla., Miami Beach—SWIMMING POOL—Arlington Hotel, to construct swimming pool, to T. C. Dixon Constr. Co., 1815 Purdy Ave., Approx. $50,000.

Ill., Salem—DRIVE-IN THEATRE—Cluster Circuit, c/o Loren Cluster, Salem Theatre, 129 S. Broadway, Salem, to drive-in theater on Route 37 near city, separate contracts. Approx. $100,000. CD 1/28.

La., New Orleans—SKATING RINK—A. H. Generes & Wm. Feiner, c/o Contractor, skating rink, to E. B. Ludwig Constr. Co., 1350 Jefferson Hy. Approx. $175,000.

Mass., Pittsfield—D&M Jct. Pl. Wks., City, to repair concrete retaining walls project, on bids to National Gunite Corp., 101 W. Dedham St., Boston. $56,000.

Tenn., Bolivar—POWER LINES—City, electric power lines, to H. B. Wissett & Co., Inc., Shrine Bldg., Memphis. $105,854. CD 3/16/47.

Tex., San Antonio—ELECTRIC LINES—City Public Service Bd., 231 N. Main, to rehabilitate and extend underground electric lines and facilities. Approx. $150,000. Separate contracts for conduit, $75,000. Furnish and Hire.

Va., Richmond—STADIUM—City, City Hall, addns. to Richmond City Stadium and laying new pavement, to Howard Mueller Constr. Co., 10 W. City St., $53,404. Alfred C. Ley, city engr.

Sask., Regina—THEATRE—Famous Players Canadian Corp., 131 Regal Bldg., Toronto, to theater on Victoria Ave. Architect, Wm. Hutchison, Regina. Approx. $150,000. CD 12/12/49.

PROPOSED PROJECTS

WATER SUPPLY

Ill., Evergreen Park—[illegible] water works equipment, pump, [illegible] water tower. $150,000. Conner Townsend & Assn., 151 E. Erie St., Chicago 11, engr.

Mass., Dighton—Town, Mt. Commission, Town Hall, 12 [illegible] water, and equip. for Dighton Water Dist. $350,000. Zumbrunn & Wentworth, 99 Bristol St., Boston, engrs.

Minn., Lauderdale—[illegible] $143,000. [illegible]

▲ Miss., Natchez—City, [illegible] $2,400,000. CD 12-6-47.

O., Sandusky—City, [illegible] $150,000.

Okla., Lawton—[illegible] $750,000. [illegible] 4-4-50.

▲ Ore., Medford—[illegible] $2,000,000.

S. D., Rapid City—Water Twp., improve, $150,000. [illegible]

Tex., Dalhart—City, [illegible] $150,000. [illegible]

▲ Tex., Dallas—City, City Hall, Main and Harwood Sts., [illegible] $7,900,000. [illegible]

Tex., Galena Park—Town, voted bonds, water supply system, $75,000. Water supply, sanitary sewer system, $175,000. C. Davis, city engr. CD 5-24.

Tex., Houston—Thousand Oaks Estates, E. B. W. [illegible] Addition to be [illegible] East Nat. Bank Bldg., water mains, [illegible] $100,000. Robert A. Brown, East Nat. Bank Bldg., engr.

Tex., Rotan and Roby—Towns of Rotan and Roby, 18 [illegible] pipeline to supply wastewater to towns of Rotan and Roby. $750,000. [illegible]

N. B., Fredericton—Municipality, [illegible] water from [illegible] station to reservoir, 12 in. [illegible] reservoir [illegible] 12 in. and 8 in. high level reservoir. $600,000. [illegible] Municipality, City Hall, City engr. CD 7-7-47.

SEWERS, WASTE DISPOSAL

Ark., Osceola—City, sewerage sys. improv., extens. $157,000.

▲ Calif., Bakersfield—City Council, City Hall, voted $1,200,000 bonds, sewage treatment plant, $1,347,000. Corrie Eng. Co., Anderson Bldg., San Bernardino, consltg. engr. CD 5-18.

Calif., Los Angeles—City, Bd. P. Wks., 153 City Hall, sanitary sewers, extend B-st. and kraft Ave., improv. Dist. $204,737. Lloyd Aldrich, city engr.

Calif., Taft—Ford, Cx. & Taft Heights Sanitation Dists., sewage collection lines and treatment plant, $161,207. R. E. White, 1716 Oak St., Bakersfield, consltg. engr.

Fla., Winter Haven—City, sewerage sys. addns., improv. Approx. $200,000. Russell & Axon Assocs., Daytona Beach, consult engrs.

Idaho, Marsing—City, City Hall, sewer facilities. $105,462.

Ind., Lapel—Town, Town Hall, sewerage sys., sewage disposal plant. Approx. $175,000.

▲ La., Baton Rouge—City, Baton Rouge Parish Council, Parish Hospital Board, mayor, Baton Rouge, drainage improv., major outlets and outlets and outlets for removal of storm water. $7,752,668. Brown & Butler, Baton Rouge, consult. engrs.

Mich., Houghton Lake—Roscommon Twp., c/o High School, Bldg., sewage disposal sys. $400,000. Consoer, Townsend & Assocs., 351 E. Ohio St., Chicago 11, engr.

▲ Minn., Hibbing—Village, G. J. Grady, Clk., storm sewers, sewage treatment plant, improvs., sanitary sewers, intersector sewers, etc. $1,000,000. Bartholomew & Assocs., 1543 University Ave., St. Paul, consult engrs. CD 1-17-50.

Mo., Berkeley—City, St. Louis 21, P.O.), City, T. D. Walsh, mayor, City Hall, Airport Rd. and Helen Ave., sanitary sewer, July 24. Air trunk and lateral sewers, Zone 2, sewage disposal plant, Zone 2, Fernando et. $650,000. Russell & Axon, 408 Dixie St., Daytona Beach, consult. engrs. CD 3-9.

Mo., Stanberry—City, sewers. $118,955.

▲ O., Dayton—and Riven Twp., Suburban Conservancy Dist., c/o Comm., Montgomery Co., Courthouse, sewage disposal plant, to Greene Co. line at Shakertown, sewerage sys. covering 1,341 acre tract. $1,218,000.

O., Girdlerburg—City, [illegible] sewers, sewage treatment plant, [illegible] on Portage River. $415,000.

Okla., Pauls Valley—City, voted bonds, sewage disposal plant, $250,000. C. E. Bretz, Commerce Exchange Bldg., Oklahoma City, consult. engr. CD 9-13.

Ore., La Grande—City, City Hall, voted $240,000 bonds, [illegible] sewer proj., David P. Slaght, city engr.

S. D., Martin—City, City Hall, sewerage constr. $120,000. [illegible] Rapid City, consult. engr. [illegible] 4-27.

S. D., Rapid City—Sewerage sys. extens. $550,000. [illegible] engr. CD 5-11.

Tex., Dalhart—City, E. G. Schmidt, III, mayor, Dalhart, sanitary sewerage sys. extens. $145,000.

▲ Tex., Dallas—City, City Hall, Main and Harwood Sts., [illegible] bonds, incinerator or disposal, $300,000; sanitary sewer, [illegible] $2,000,000; storm sewers, $1,400,000; [illegible] engr. CD 5-24.

Tex., Galena Park—Town, voted bonds, sanitary sewer system, $150,000. sewage disposal plant, $100,000. C. Davis, city engr. CD 5-24.

Tex., Houston—Thousand Oaks Estates, E. B. W. [illegible] Addition to be [illegible] East Nat. Bank Bldg., storm sewers, [illegible] $125,000; sanitary sewer, [illegible] $150,000. Robert A. Brown, East Nat. Bank Bldg., engr.

Tex., San Antonio—C. F. Bailey & Assocs., 115 Marine, [illegible] sanitary sewer and paving, [illegible] $210,000; 12 [illegible] Authority, [illegible] $100,000.

Ont., London—Council, Mayor George Wenige, sewer extens., new sewers. $600,000. William Watson, K.C., & Wilson Gordon, engrs. CD 9-6-49.

BRIDGES

▲ O., Zanesville—Comrs., Muskingum Co., Courthouse, $2,500,000 bond election Nov. 7, repair and rebuild bridges. CD 11-17-49.

STREETS AND ROADS

N. J., Mount Holly—Burlington Co., Mount Holly, requests repair of 4th St. from Riverside Chapel to Route 25. $60,000. replace Levitt St., Florence, $60,000. Rebuild Fellowship Rd., approx. 1 mi. $55,000.

▲ Oklahoma—Oklahoma Turnpike Authority, Oklahoma City, [illegible] Company, $1,000,000. Deleuw, Cather & Co., 1 N. Wacker Dr., Chicago 6, Ill., engrs. CD 3-3-47.

Tex., Angleton—Brazoria Co., Courthouse, Angleton, rebuild [illegible] bridge structures and [illegible] paving. Lake [illegible] Short Route. $150,000. E. W. Linnett, co. engr.

Tex., Corpus Christi—City, addtl. [illegible] sidewalks throughout city. $200,000. Robert L. Otis, city engr. CD 12-29.

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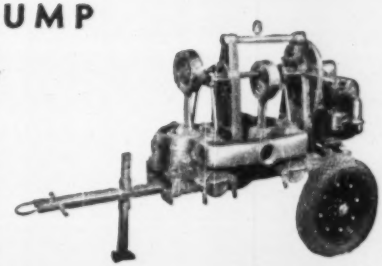

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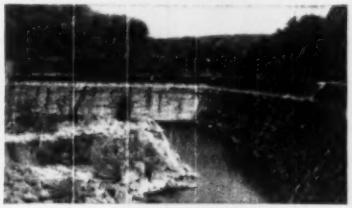
Bethlehem Reinforcing Bars

(continued on page 87)

COMMERCIAL BUILDINGS

DAM SAVED WITH "GUNITE" BY CEMENT GUN COMPANY



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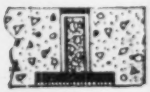

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▲ Tex. Dallas — ... $10,000,000

▲ Tex. Fort Hood (Killeen) — ... $3,500,000

Tex. Freeport — ... $265,000; ... $400,000; ... $300,000

▲ Tex. Handley — ... $2,000,000

Tex. Houston — ... $450,000

▲ Tex. Houston — ... $1,200,000

Tex. Houston — ... $425,000

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Tex. Houston — ... $300,900 ...

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Tex. Houston — ... $1,000,000; ... $250,000

Tex. Houston — ... $504,000

Tex. Houston — ... $400,000

Tex. Houston — ... $800,000

▲ Tex. Lubbock — ... $3,750,000

▲ Tex. Pasadena — ... $1,000,000

Tex. San Antonio — ... $600,000; ... $1,000,000

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UNCLASSIFIED

Colorado—RURAL DISTRIBUTION LINES—Morgan County Rural Electric Assn., Fort Morgan (rural distrib. and sub. lines); 42 mi. new lines, Morgan co., $675,000. VLD 6-19-46.

Conn., Milford—GAS SPHERE—Yale Laven Gas Light Co., 80 Trow St., New Haven, 60 ft. diam. gas storage sphere, $200,000.

Ga., Decatur—TABLE M—City, bond elect. Sept. 26 for high school athletic stadium renovation, $234,000.

Indiana—RURAL DISTRIBUTION LINES—Rush County REMC (Rushville), 250 mi. rural distrib. lines and sub. stations, Rush Co., $200,000.

Ind., Greenfield—DRIVE-IN THEATRE—Jesse M. Smiley, Pioneer Arcade, Greenfield, invites theatre, drive-in, bowling, tower, promotion and concession bldgs., water, sewer, etc. facilities; between Sept. and Dec. for Apr. 1951 opening, $100,000.

Iowa—RURAL DISTRIBUTION LINES—S. E. Iowa Cooperative Electric Assn., Mt. Pleasant, 227 mi. rural distrib. lines, Henry Co., $367,000.

Kansas—RURAL DISTRIBUTION LINES—Radiant Electric Cooperative, Inc., Fredonia, 107 mi. rural distrib. lines, Montgomery, Neosho, Wilson counties, $233,000. Flora Eng. Co., 302 Jackson St., Topeka, engr.

Louisiana—NATURAL GAS PLANT and PIPE LINE—Marine Tattering Co., H. H. Blaffer, pres., Commerce Oil Co., Commerce Bldg., Houston, Tex., natural gas separation and compression plant, Gueydan area, Vermilion Parish, $400,000. 12 mi. 8-in. pipe line connecting natural gasoline plant to line. World's first 36 ft. below surface home above line of permission Parish, eaten out into Gulf of Mexico, drilling platforms, $350,000.

Missouri—RURAL DISTRIBUTION LINES—Central Missouri Electric Cooperative, Sedalia, 226 mi. rural distrib. lines, 10 counties, Pettis Co., $450,000.

Nebraska—PIPE LINE—Nebraska Natural Gas Co., Casper, Wyo., gas distribution pipe line from Lusher, Fitts No. 1 to Sidney and distr. sys. in city of Sidney, $60,000; gas pipe line from fields near Sidney to Dalton, Gurley, and on to Bridgeport, $250,000.

N. Y., New York—PLAYGROUND—Dept. Parks, Arsenal Bldg., plans by Gustave Ehrgott, early play ground and public comfort station, Cherry & Water Sts., Manual Training High School, Catherine St., $135,000. C. J. 14 Apr.

▲Ohio—TRANSMISSION LINES—Toledo Edison Co., Edison Bldg., Toledo, transmission and distr. lines, substations and service facilities to be added during 1950, and 1951, in northwestern Ohio, $4,000,000. E. W. Moser, engr.

Okla., Oklahoma City—HIGHWAY ALLEY—Bonner & Orr, 210 N. W. 14, contr. by Fort & Arrington Const. Co., 1000 W. Britton Rd., N. W., 11 and Mar. Ave., $125,000.

South Carolina—RURAL DISTRIBUTION LINES—Fairfield Electric Cooperative, Winnsboro, 1,000 mi. rural distrib. lines, Fairfield, Kershaw, Lancaster, Chesterfield, Richland counties, $220,000.

South Dakota—RURAL DISTRIBUTION LINES—Tri-County Electric Cooperative, Marion, 1,000 mi. rural distrib. lines, Turner, Hutchinson, Bon Homme counties, $485,000. Black & Veatch, engrs., Reliance Exchange Bldg., Sioux City, Iowa.

Tennessee—RURAL DISTRIBUTION LINES—Holston Electric Cooperative, Rogersville, 50 mi. rural distrib. lines, Hawkins Co., $245,000.

▲Texas—TRANSMISSION LINES—Texas Power & Light Co., Dallas, 345-kv. transmission line, Big Spring to Abilene, $11,885,000; also for transmission line, Fort Worth area, $7,655,776.

Tex., Bellaire—TRACT DEVELOPMENT—Bellaire Development Co., R. A. Fitzsimons and Dan Eiel, 8 A. tract, Bellaire Blvd. and Fifth St., Houston, 4,000 sq. ft. office bldg., 2,000 sq. ft. retail bldg., 100 lots, Acres, $750,000. Hare & Hare, 1214 W. 11th St., Austin, engrs. for water, sewer, paving, drainage, etc. facilities, $50,000. Architect for office bldg. not selected, $40,000. Architect for retail bldg. not selected, $85,000. Special permit and building fees, $75,000.

Tex., Galena Park—SWIMMING POOL—Park, Texas, voted $100,000. C. Dan Erwin, engr.

Tex., Waco—GATE HOUSE—Mission Park, T. Y. Waco, Inc., 1000 W. Waco Dr., Waco, gate house, $150,000.

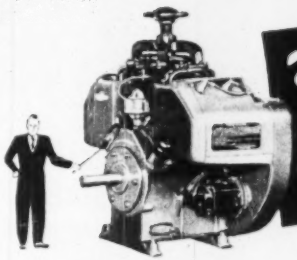
Wash., Richland—[illegible], $160,000.

Wash., Wenatchee—[illegible], $1,000,000.

Wyoming—RURAL DISTRIBUTION LINES—Wheatland Rural Electric Assn., Wheatland, 1,000 mi. rural distrib. lines, Platte, Goshen, Laramie counties, $151,000.

▲Alberta—[illegible], $2,000,000.

▲Que., Grand'Mere—[illegible], $1,600,000.



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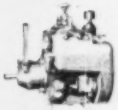
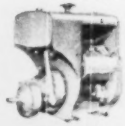


17.5 to 25 hp.

V VP-4



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	Cloth	Paper	Bulk	Gravel	Sand	¾-in.	2-in.	¾-in.	2-in.	Sand gray, Lt. wgt. agg.	3,000 p.s.i., del.
Atlanta	$4.30	$4.15	$3.90	$2.00	$1.75	$2.10	$2.10	$1.65	$1.85	$0.1725	$0.1725	$21.00
Baltimore		3.39	3.14	2.40‡a	2.40‡a	1.95‡a	2.10‡a	2.45‡a	2.45‡a	16	16¢	19.25
Birmingham	3.80	3.60	3.35	2.25	2.25	1.85	2.30	1.00	1.20	145	145	2.75
Boston		3.67	3.41	2.50‡	2.50‡	1.90‡	1.70‡			196	205‡	19.45‡
Chicago	3.69	2.99	2.74	2.75‡b	2.75‡b	2.20‡b	2.75‡b	2.00‡	2.00‡	20	20¢	9.70
Cincinnati	4.14	3.84	3.68	2.00‡c	2.25‡c	1.90‡c	2.00‡k	1.50	1.50	145	205	10.15
Cleveland	3.85	3.60	2.75	1.90‡f	1.65f	1.55	3.55‡a	2.75‡	2.75‡	22	22	11.80
Dallas	3.54	2.74	2.49	2.00	2.15	1.25	2.10	2.15		088¢	125	9.30
Denver		3.34	3.24	1.85	2.00	1.15				20	23¢	9.65
Detroit		2.98‡	2.71	3.25‡h	1.25‡h	3.00‡i	3.10‡i 3.25‡	3.10‡i 3.25‡	3.00‡	18	19¢	9.85‡
Kansas City		3.33	2.88	1.60	1.60	1.95‡	1.95‡			175¢a	215¢	10.40‡k
Los Angeles		3.72‡a	3.42a	1.95‡k	2.04‡k	1.74‡a	1.92‡k	1.92‡k		105f	205	10.10‡k
Minneapolis		3.35‡d	3.15‡d	2.30‡a	2.30‡a	1.85‡a	2.05‡a	2.05‡a		21¢		11.45
Montreal		2.45‡e	2.31‡e		2.50‡i	2.00‡i	8.50‡	1.10‡j		22	29¢	9.05‡l
New Orleans		3.05‡	2.70‡	2.32	2.32	1.82			1.05	1.25	25		12.40
New York		3.49	3.24	2.10‡	2.10‡a	1.45‡	2.35‡	2.35‡				10.50‡a
Philadelphia	3.90‡	3.45‡	3.45‡	2.87	3.17‡	2.45‡	2.85‡	2.05‡	1.90‡	1.50	1.50	18	22		10.50
Pittsburgh	3.90		3.18	2.85	2.05‡	2.05‡	2.10‡	2.50‡	2.50‡	2.05	2.05	21¢	21¢		11.10
St. Louis		2.90	3.05‡	2.80‡	2.40‡	2.40‡m	2.40‡m	2.10‡	2.10‡m	1.60	1.60	1.15	1.15	215	23¢v		9.40
San Francisco		3.39		2.95	1.80	1.80	1.90								25¢		10.15¢
Seattle		3.55‡		3.05‡	2.75‡m	2.75‡m	2.75‡m	3.50‡m	3.50‡m						22¢		31.35‡		10.25

* Delivered. ‡ Prices not dealers quote, except as noted. ‡ CEMENT: a Subj. to 10¢/bbl. discount for cash. b Less 2% for cash. c C.L. price dealers' cost; not subj. to change. d Dealers will unload from cars; no switching charges. e Cement in 87-lb. cotton bags; paper bags include bags. f Delivered to contractor's job. g Includes bags. h Dealers will unload from cars; no switching charges. i Delivered to contractor's job. j Includes bags. k Less 2% for cash. l Delivered to contractor's job. m Less 2% for cash. ‡ CONCRETE BLOCK: a Cinder. b Waylite. c Haydite. d Celocrete. e 5 x 8 x 12-in. f Del. truck at job. g F.o.b. truck at job. h Less 2% for cash. ‡ READY MIXED CONCRETE: a 5 cu. yds. or over del. Mon.-Fri. b 10 cu. yds. or over del. Mon.-Fri. c 3,000 p.s.i. concrete. d 3,000 p.s.i. concrete. e Less 2% for cash. ‡ SAND, GRAVEL, STONE & SLAG: a Truck price. b Del. to job. c Screened. d Pea gravel. e Bankrun gravel. f Pea gravel. g Less 5% for cash. h Less than 5 tons. i Less than 50 tons. j Less than 100 tons. k Less 5% for cash. l Less 2% for cash. m Less 2½% for cash.

CASH DISCOUNTS ON CEMENT to contractors: Truck deliveries, 2% for cash on 10th of month; on carload deliveries, to trucking firms as dealer cash discount, 10¢ per bbl. for payment within 15 days of date of invoice. Subject discount 10¢ per bbl. 20 days at Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not refunded. For used bags, add $1.05 per bbl.; 25¢ refund allowed for each returnable bag; for paper bags add 25¢ per bbl.; not refundable.

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn.	$2.40	Buffington, Ind.	$2.30	Steelton, Minn.	$2.40	Muskegon, Mich.	$2.30	Toledo, O.	$2.40‡
Clinchfield, Ga.	2.40	Independence, Kan.	2.30	Leeds, Ala.	2.25	Superior, Mich.	2.35‡	Milwaukee, Wis.	2.40‡
Kingsport, Tenn.	2.40	Hannibal, Mo.	2.35	Dolomite, Minn.	2.40	Wyandotte, Mich.	2.40‡	Green Bay, Wis.	2.40‡
West Des Moines, Iowa	2.45‡	Northampton, Pa.	2.40	Hudson, N.Y.	2.40	Buffalo, N.Y.	2.40‡	Ironton, O.	2.40
Nazareth, Pa.	2.40‡	Universal, Pa.	2.40	Alpena, Mich.	2.25‡	Oswego, N.Y.	2.60‡	Montreal City	2.13
Bath, Pa.	2.40‡	Waco, Tex. (+ 10¢ tax)	2.30	Detroit, Mich.	2.40‡	Cleveland, O.	2.40‡	W. Winfield, Pa.	2.40‡

‡ Prices to hold for third quarter of 1950.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT		ASPHALT BINDERS—FLUXES		CUTBACK ASPHALT		ROAD OIL	ASPHALT EMULSION (Quick-breaking)	
	Granite, Per M lots of 50,000 4x8x8 in.	Brick, per M on rail lots 3¼x8¾ in.	Wood, per sq. yd. 4½ in. 10-lb. treat.	Per ton, less than 80-100 penetration		Per gal., 80-100 penetration		Per ton		Per gal.	Per gal.	
				Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$74.00	$55.00	$2.25									
Baltimore	150.00‡	57.50‡		$21.00		$.085	$0.14	$.085	$.16	$.085a	$.085	$0.11
Birmingham		32.50										
Boston				24.50a	$35.50a	500a	185a	115a	205a	10a	113a	205a
Chicago	155.00‡a	55.00	2.75	3.40‡	20.25b	30.25b	19.25b	24.25b	085‡b	16b	075b		
Cincinnati				21.50a		095	085	095a				
Cleveland		55.00‡	3.45‡	24.00	35.50	24.00c	33.50c	10c	22c	10	11	
Dallas	e	40.00	e	25.95	42.95	1012	1808	29.99	47.97	1687	1062	1423
Denver		45.00										
Detroit		52.00		20.65		12.00c		075‡c		075		197
Kansas City	e	e	e	18.05‡f				07‡c	075a	061c		
Los Angeles	e		e	13.50‡m		12.50‡c		13.50‡f		12.50‡c	0775g	1575g
Minneapolis			2.85A	25.50	36.00	24.00c	33.00c	14.00	35.00	09	12	22
Montreal	137.00	e	e	27.85‡	36.65‡	16.20‡c	18.50‡c	16.20‡c	18.00‡c	13.20‡c	174‡	215‡c
New Orleans				16.50c		10c		08c		077c	08	1425c
New York			2.35‡	23.30	35.80‡	22.50c	41.85‡c	091‡c	1767‡c	0803	0910	1747‡
Philadelphia	150.00	110.00	4.00	23.00‡		22.00‡		065c				
Pittsburgh	165.00	42.00	4.50	22.00	35.00	10	22	27.00	39.00	095	09	201
St. Louis				19.25‡		1650		1843‡g		15		
San Francisco		92.75‡		14.50‡	30.00‡g	13.50‡c		16.50‡c			08	14
Seattle				14.50‡	35.00‡	13.00‡c		1650‡c	2050‡c	16.00‡c	08‡	09‡

‡ Delivered. a Price at point. Exports: Mass. b F.o.b. refinery, Lockport, Ill. c F.o.b. refinery, Richmond, Calif. d F.o.b. refinery, Sugar Creek, Mo. e F.o.b. refinery, El Segundo, Calif. f F.o.b. refinery, Martinez, Calif. g F.o.b. Wood River or Roxana, Ill. h F.o.b. refinery, Englewood, Calif. i F.o.b. refinery, Los Angeles, Calif. j Less than 100 gal. k 40-50 penetr. l Tax incl. m 80-100 penetr. n Tax not incl. Dealer not stated. o Shipped in steel tank cars. p Use of steel drums. q Shipped in steel drums.

PAVING BRICK & BLOCK: a C.L. A 3¼ x 4 x 8½ in. b 2¼ x 3½ x 8 in. c Del. Richmond, Calif. d Del. Los Angeles. e Not quoted. f 2¼" thick. g Del. job. h Less than C.L. i Del. Madison, Wis. j Del. Milwaukee. k Del. Chicago. l Del. Minneapolis. m Del. Detroit. n Del. Cincinnati. o Del. Cleveland. p Del. Buffalo. q Del. Montreal. r Del. Toronto. s Del. Winnipeg. t Del. Vancouver.

ASPHALT: a Price at point. Exports: Mass. b F.o.b. refinery, Lockport, Ill. c F.o.b. refinery, El Segundo, Calif. d F.o.b. refinery, Sugar Creek, Mo. e F.o.b. refinery, El Segundo, Calif. f F.o.b. refinery, Martinez, Calif. g F.o.b. Wood River or Roxana, Ill. h F.o.b. refinery, Englewood, Calif. i F.o.b. refinery, Los Angeles, Calif. j Less than 100 gal. k 40-50 penetr. l Tax incl. m 80-100 penetr. n Tax not incl. Dealer not stated. o Shipped in steel tank cars. p Use of steel drums. q Shipped in steel drums. r 55-gal. drums.

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT. SHAPES PLATE	REINF. BARS	RIVETS ½ in. shank	SHEET PILING	STEEL RAILS Per Net Ton			TRACK SUPPLIES			
					Standard	Light	Relaying	Angle Bars	Std. spikes	Tie Plates	Track Bolts
Birmingham Area	$3.40	$3.45	$7.25		$68.00	$75.00	Not	$4.40	$5.00	$4.20	
Chicago Area	3.40	3.45	7.25	$4.20	68.00	75.00	quoted	4.40	5.00	4.20	
Pittsburgh Area	3.40	3.45	7.25	4.20	68.00	75.00		4.40	5.00	4.20	
Buffalo Area	3.45	3.45	7.25	4.20	68.00	75.00		4.40	5.00	4.20	$8.85
Cleveland			7.25								8.85
Youngstown Area		3.45							5.00		
Geneva	3.40										
Los Angeles	4.15								5.00		
Pueblo	3.40	3.45			68.00	75.00		4.40	5.00	4.20	8.85

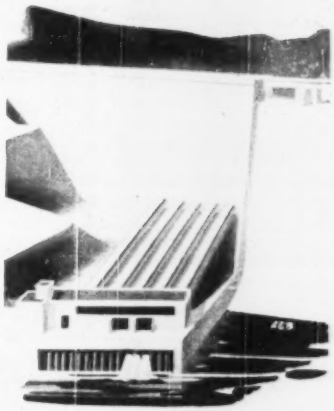
IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb. base price		EXPANDED METAL LATH Per 100 sq. yd., carload lots		WELDED FABRIC REINFORCING Per 100 sq. ft., carload lots		
		3 tons to carload	Add $ per for	Std. diamond mesh	Std. ribbed	4x16 in. No. 6 & 10 wires	4x12 in. No. 8 & 12 wires	6x6 in. No. 6 & 6 wires
	New Jers.	Rail steel	switch bars	Dem.				
Atlanta	$3.83	$3.60	$3.60	$3.025	$4.10	$31.50	$31.50	
Baltimore	3.99	3.99			4.10	40.00	43.00	
Birmingham	3.40	3.25	3.25		4.10	32.00	44.50	
Boston	3.75	3.90	3.90		4.10	33.00	33.00	
Chicago	3.25	3.50	3.50	1925		32.00	34.50	
Cincinnati	3.29	3.49				34.00	36.50	
Cleveland	3.37	3.47			4.10	34.00	36.50	
Dallas	3.75	3.45	3.45			43.50	46.00	
Denver	3.65	3.75				38.00	52.00	
Detroit	3.84	3.30			4.10	37.00	46.00	
Kansas City	3.60	3.70				35.50	38.00	
Los Angeles	3.90	3.50				38.00	40.00	
Minneapolis	3.68	3.70	3.70			33.00	36.50	
Montreal	4.75	4.75				44.00	46.50	
New Orleans		3.90				38.50	41.00	
New York	3.68	3.38				35.00	38.00	
Philadelphia	3.59	3.69				34.00	38.00	
Pittsburgh	3.20	3.20				32.50	34.00	
St. Louis	3.58	3.44	3.44			32.00	38.00	
San Francisco	4.00	3.75				37.50	40.00	
Seattle	4.05	3.80				38.00	42.00	

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C.I. PIPE	VITRIFIED SEWER PIPE	CLAY DRAIN TILE ASTM C 4	CONCRETE SEWER PIPE	WROUGHT STEEL PIPE
		Per 100 ft. delivered ASTM C 13-41		Per 100 ft. delivered ASTM C 14-41	Per ft. carload lots Full standard weight
Atlanta	$8.50	$8.45	$4.00	$8.45	$2.00
Baltimore	9.30	7.80	3.90	7.80	2.00
Birmingham	8.20	8.00	3.80	7.80	2.00
Boston	9.70	11.00	5.00	9.00	3.00
Chicago	10.40	9.08	4.25	8.00	2.65
Cincinnati	9.50	8.80	3.80	8.00	2.20
Cleveland	9.25	8.85	3.90	8.00	2.40
Dallas	10.20	9.00	4.00	8.00	2.40
Denver	10.40	10.00	5.00	9.00	2.60
Detroit	9.25	9.25	4.00	8.00	2.40
Kansas City	9.85	11.08	5.00	9.00	2.60
Los Angeles	11.00	8.80	4.00	11.00	2.60
Minneapolis	9.50	10.00	4.50	9.00	2.60
Montreal	10.00	9.00	4.00	8.00	2.60
New Orleans	9.00	9.00	4.00	8.00	2.60
New York	9.50	9.50	4.00	8.00	2.60
Philadelphia	9.50	9.50	4.00	8.00	2.60
Pittsburgh	9.25	8.85	3.90	8.00	2.40
St. Louis	9.25	9.25	4.00	8.00	2.40
San Francisco	10.00	9.00	4.00	8.00	2.60
Seattle	10.00	9.00	4.00	8.00	2.60

Preventing Corrosion "Freeze-ups" in Penstock Expansion Joints . . .



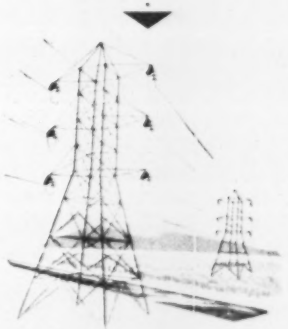
PROJECT: *To provide with practical economy and low maintenance, safe transfer of water to power house at Shasta Dam—a distance of some 835 feet—with allowance for expansion and contraction and to withstand temperature variation under all climatic and water conditions.*

DESIGN: *Five steel penstock lines with free-moving sliding expansion joints having inner sleeves of Lukens Nickel Clad Steel. Smooth, work polishing nickel surfaces to permit freedom of motion and resist corrosion and cavitation. Steel backing to provide strength and rigidity.*

END RESULT: *Six years of safe, trouble-free service. No corrosion "freeze-ups", no buckling of lines regardless of weather. Minimum of inner sleeve maintenance.*

Here is an example of how the coordination of design, fabrication and materials selection provided the economical answer to a structural problem—just as in other cases it has resulted in equipment that not only lasts longer, but improves product quality and lessens production costs. This is applied *Lukenomics*. For Lukenomics combines the experience of designers, engineers and equipment builders with Lukens' knowledge of materials and their application gained over 140 years as the world's leading producer of specialty steel plates, heads and steel plate shapes.

It's sound investment insurance to put Lukenomics to work on *your* equipment problems. There are progressive fabricators who can do this for you. Get in touch with them or write our Manager of Marketing Service, stating your problem. There's a Lukenomics team ready to go to work on it. Lukens Steel Company, 513 Lukens Building, Coatesville, Pennsylvania.



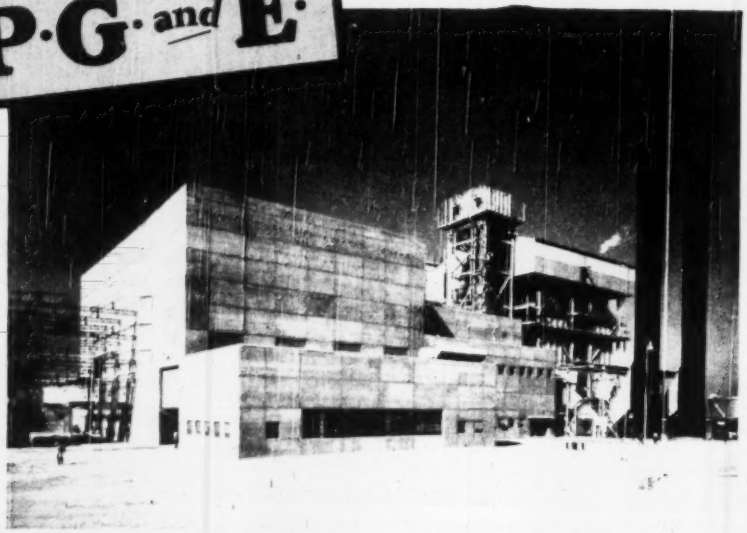
The expansion joints of penstock lines at Shasta Dam were designed and fabricated by Chicago Bridge and Iron Company for the U. S. Bureau of Reclamation. Lukens Nickel Clad Steel was used for the inner sleeves.

LUKENS

LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

FOR P·G·and E·



The Kern Steam Plant and the extension to Station P of the Pacific Gas and Electric Company represent the finest examples in the country of centralized control in steam power stations.

The Kern Steam Plant, with an installed rated capacity of 175,000 kw, recently completed for the Pacific Gas and Electric Company in Kern County, about 300 miles south of San Francisco in the San Joaquin Valley.

The extension to Station P, with an installed rated capacity of 222,000 kw, designed and constructed by Stone & Webster Engineering Corporation for the Pacific Gas and Electric Company at Hunters Point, San Francisco.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

SHORT LEAF YELLOW PINE AND DOUGLAS FIR

All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Rift. Prices in Bold Face:

	SHORT LEAF YELLOW PINE										LONG LEAF Y. P.		PLYWOOD	
	1x6 4-S	1x8 4-S	2x4 4-S	2x6 4-S	2x8 4-S	2x10 4-S	2x12 4-S	10x12 4-S	12x12 4-S	2x12 4-S	12x12 4-S	Rail freight to common point
Atlanta	$74.00	$74.00	$66.00	$68.00	$72.00	$75.00	$75.00						$22.32	$27.24
Baltimore	68.00	75.00	67.00	70.00	70.00	72.00	81.00					$145.00	$148.00	22.80	27.90
Birmingham	73.00	76.00	63.00	65.00	68.00	75.00	85.00					115.00	125.00	21.78	26.58
Boston	86.00	86.91	91.00	91.00	91.00	96.00						114.00	114.00	22.80	27.90
Chicago	91.93	92.94	83.85	92.93	97.98	100.101	100.102					122.125	122.125	18.72	22.80
Cincinnati	86.00	89.00	89.00	88.00	88.00	96.00	105.00							21.78	26.58
Cleveland	95.00	97.00	80.00	95.00	97.00	99.00								22.20	27.12
Dallas	63.00	70.00	61.00	53.00	56.00	57.00	90.00					86.00	88.00	18.72	22.80
Denver														14.94	18.08
Detroit	95.00	97.00	80.00	83.00	92.00	93.00						97.00		21.78	26.58
Kansas City	112.00	119.00	125.00	122.00	126.00	128.00	138.00							16.56	20.16
Los Angeles														14.88ch	16.26ch
Minneapolis														16.56	20.16
Montreal	74.50	77.50	75.00	75.00	78.72	87.13									
New Orleans	75.00	78.00	71.00	75.00	78.00	80.00						130.00	130.00	18.72	22.80
New York	102.50 110	105 112.50	105 115	105 115	110 120	115 125	125 135					210 240	210 240	22.80	27.90
Philadelphia				Range from $88.00 to $97.03			88.97					180.00	180.00	22.80	27.90
Pittsburgh	85.90	85.90	85.90	85.90	85.90	90.100	100.00					100.110	120.130	22.56	27.48
St. Louis	101.50	104.75	92.96.50	96.50	104.25	108.50	114							18.72	22.80
San Francisco														16.08	12.00
Seattle															

† Delivered. ‡ Retail D/L. * Yard prices.

TIMBER: Bold Face type, Southern Pine. Dollars, Douglas Fir. ‡ Spruce. § Tax exempt. ‖ SM bdft. ¶ 8-12 ft lengths. ** 8-16 ft lengths. †† 8-18 ft. ‡‡ 8-20 ft. ¶¶ No. 2 common. *** 6-10 12 ft lengths. ††† 8-16 ft lengths. ‡‡‡ 8-20 ft lengths. ¶¶¶ Delivered. ** Longleaf. †† Price set day shipment is made, changing constantly.

PLYWOOD: Special concrete form grade Fir Plywood, 4 ft. by 8 ft. panels, 5-ply, sanded 2 sides, water resistant resin cemented lots, delivered per 1,000 sq. ft. surface. Seattle base price on 2,000 sq. ft. $127.00, on 2,500 sq. ft. $234.00. For other centers add rail freight increment from table on proper size. Online and edge sealing charges not included. ‡ Lower rate by water-shipment. § 50,000 sq. ft. minimum. ¶ Freight rate increase of 10 per cent not included in these figures.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS		EXPLOSIVES	
	Discounts from jobbers		Per lb. 40% Ammonia	
	Single or Double Thickness		Carlots to 50,000 lbs., cases included	
	A quality	B quality		
Atlanta	20%	20%	$0.2025	
Baltimore	80 10%	80 10%	.2025	.25
Birmingham	80%	80%	.1950	.25
Boston	80%	80%	.2025	$0.0225
Chicago	80%	80%	.2025	.25
Cincinnati	80%	80%	.2025	
Cleveland	80 10 10%	80 10 10%	.2025	
Dallas	80%	80%	.2025	
Denver	80%	80%	.2025	
Detroit	80 10 10%	80 10 10%	.2025	
Kansas City	80%	80%	.2025	
Los Angeles	80%	80%	.2025	
Minneapolis	80 10%	80 10%	.2025	
Montreal	80 10%	80 10 10%	.2025	
New Orleans	80%	80%	.2125	
New York	80%	80%	.2025	
Philadelphia	80%	80%	.2025	
Pittsburgh	80%	80%	.175	
St. Louis	20 10 10%	20 10 10%	.2025	
San Francisco	80%	80%	.2025	
Seattle	80%	80%	.225	

40% Ammonia Gelatin price ranges in other than urban areas, per lb. except Seismograph Grades

C.I.F. 20.00

PILES, TIES F.O.B.

PILES

Prices per linear foot, butt and pine, f.o.b. cars, New York. To Laurel in Wash. and Ore. points to New York shipping area, rate based on freight from Norfolk.

Diameters	Points	Length	Pine	Fir
12 in. at 6 ft.	6 in.	30 to 50 ft.	$0.43	
12 in. at 2 ft. from butt	6 in.	50 to 70 ft.	.46	
12 in. at 2 ft. from butt	6 in.	70 to 90 ft.	.50	
12 in. at 2 ft. from butt	6 in.	90 to 100 ft.		.74
13 in. at 2 ft. from butt	5 in.	50 to 70 ft.		.80
13 in. at 2 ft. from butt	6 in.	70 to 90 ft.		.84
13 in. at 2 ft. from butt	6 in.	90 to 100 ft.		.88
14 in. at 2 ft. from butt	6 in.	50 to 69 ft.	.50	.82
14 in. at 2 ft. from butt	6 in.	70 to 89 ft.	.54	.84
14 in. at 2 ft. from butt	6 in.	90 to 100 ft.	.58	.92
14 in. at 2 ft. from butt	5 in.	50 to 69 ft.	.52	.82
14 in. at 2 ft. from butt	5 in.	70 to 89 ft.		.84
14 in. at 2 ft. from butt	5 in.	90 to 100 ft.		.92

Over cutting over 50% is available only in limited quantities.

RAILWAY TIES

Product	Cut			
	Tie			
Boards	Cut			
	Tie			
New York	S. P. Sap Gum	$1.05	$1.00	$1.25
	Mixed Oak	2.00	2.00	2.50
Birmingham	Hardwood	1.00	1.00	
Cincinnati	Red Gum		2.30	2.00
Los Angeles	Douglas Fir			
	Redwood			
Philadelphia	Red Gum	2.45	3.00	1.10
St. Louis	White Oak	2.40		1.10
	Red Oak	2.35	3.00	1.10
	Red Gum	2.00		1.00
	Sap Gum or Cypress	2.00		1.00
San Francisco	Douglas Fir	1.25	2.10	1.20
Montreal	Balsam Maple			

Tie: Treated. Cut: Untreated. ‡ Untreated. § 7 ft. ¶ 8 ft. ** Longest cut. †† 6 ft. cut. ‡‡ Commercial grade. §§ 8 ft. ¶¶ 9 ft.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

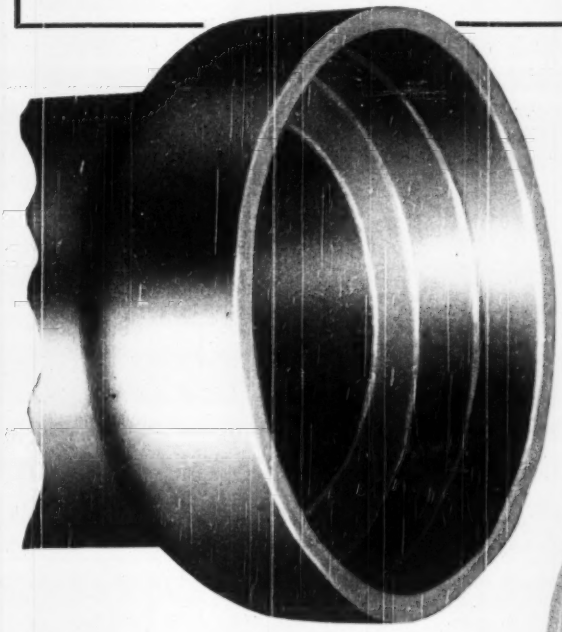
Bleaching powder in 35 cent cask, per 100 lb.	$1.50
Chlorine, cylinders, per lb.	.08 .15
Hydrated chloride, 77-80%, drums, 100 lb. (open top, f.o.b. works)	
ton	22.00
Silicate of soda, 52 deg. in drums, f.o.b. works, per 100 lb.	1.80
Soda ash, 58% in paper bags, per 100 lb. delivered	1.45
Sulphate of aluminum in commercial, 100 lb. bags, f.o.b. works	1.50
Sulphate of aluminum in lump, per 100 lb. f.o.b. works	1.30

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION		STRUCTURAL CLAY TILE BEARING, SCORED		LOAD	BRICK	LIME		
	Per M (not 2000 pounds per ton)					Per M, in quantity	Per ton, in paper-lined bbl.		
	8x12x12 in.	8x12x12 in.	8x12x12 in.	8x12x12 in.	12x12x12 in.	Common	Hydrated	Hydraulic	Pulverized
						Sand-struck	Common	Hydrated	Quicklime
						Interior	Finishing	Finishing	or lump
Atlanta						$25.00	$25.00	$17.50	$17.50
Baltimore	$175.00	$185.00	$195.00	$300.00		31.00	29.00	29.00	
Birmingham	92.50	104.00	165.00	214.00		20.00	22.50	24.24	19.00
Boston	140.00	145.00	280.00	317.00		32.00	35.00	30.00	26.40
Chicago	115.00	127.50	230.00			21.00	21.00	28.50	23.00
Cincinnati	171.00	190.00	256.00	278.00	355.00	400.00	32.50	34.00	24.25	24.25	24.25
Cleveland	118.00	126.00	236.00				30.00	30.00	24.00	22.00	27.50
Dallas		110.00					18.75	21.25	21.00	21.00	
Detroit							32.00	32.00	34.00	28.00	34.00
Denver	117.00	124.00	234.00		$290.00	$332.22	33.00	32.00	28.00	26.00	
Kansas City	115.00	132.00	245.00	305.00	367.00	25.00	25.00	28.00	22.00	25.00	
Los Angeles							20.00	20.00	26.00	26.00	32.00
Minneapolis	158.00	176.00	226.00	176.00			31.25	35.25	35.00	26.00	35.00
Memphis	145.00	175.00	252.00				25.00	35.00	22.00		22.00
New Orleans	190.00	190.00	190.00				29.00		28.00	26.00	37.00
New York	118.26	126.00	174.00	180.00			31.00		34.00	26.00	
Philadelphia	136.00	143.00	252.00	302.74	361.35	455.74	27.00	30.00	31.00	19.50	24.50
Pittsburgh	132.00	132.00	198.00	206.00	274.00	312.80	28.00	28.00	24.00	22.00	2.97 ton
St. Louis	129.00	135.00	252.00		339.00		34.50	32.50	60.00	Mixing	1.00 ton
San Francisco	142.00	148.00	198.00	148.00			32.00		25.00	25.00	2.40 ton
Seattle	150.00	160.00		160.00			32.00	30.00	34.00	34.00	3.60 ton

Footnotes: Hardware, common, per cwt., 4 x 12 in., 12½ x 8 x 11 in. Lay contract. Stacked time. 8 x 8 x 12 in. Stacked bbl. Delivered bbl. Finishing, mason. 4 x 8 x 12 in. Pebble-lime prices per 50-lb. sack. Price per ton. Lime hot sold per ton at works, paid to N.Y.C. Price delivered. 4x8x12 x 12 in. Pebble-lime, 8 bbl. common. Select. Red face. 180 lb. 4 x 7½ x 12 in. Finishing, mason

Geared to Give You ADVANTAGES EXTRAORDINARY



Universal Sewer Vitrified Clay Pipe

COMPLETE SIZE RANGE

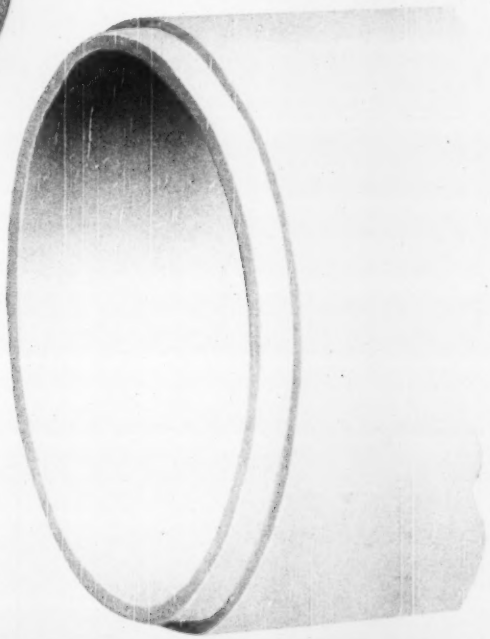
3" to 36" inclusive

FACTORIES

Uhrichsville, Ohio (2) New Philadelphia, Ohio—Palmyra, Ohio

OTHER VITRIFIED PRODUCTS

Flue Lining • Stove Pipe • Chimney Tops • Chimney Pots Wall Coping • Fire Brick • Fire Clay • Septic Tanks Segment Sewer Block • Tylox Rubber Coupling • Slipseal Sewer Joint • Meter Boxes • Aerodrane Filter Block • Ship Lap Wall Coping



United States Concrete Pipe

COMPLETE SIZE RANGE

Machine and cast concrete pipe—6" to 120" inclusive

FACTORIES

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Sales Offices *for* Universal Sewer *and* United States Concrete

NEW YORK, 3917 Lincoln Building, 60 E. 42nd St., Tel. MU 7-7395
BALTIMORE, MD., Hallethorpe Branch, P. O. Box 7769, Tel. Elkridge 790
CINCINNATI, OHIO, P. O. Newtown, Ohio Box 215, Tel. Locust 7846

UNIVERSAL SEWER PIPE CORPORATION
UNITED STATES CONCRETE PIPE COMPANY
GENERAL OFFICES • 1500 Union Commerce Building • CLEVELAND 14, OHIO

A WAR VETERAN WHO IS PAYING A BONUS

Engineered BUTLER Design

Here's a BUTLER Central Mixing Plant with a talent for travel coupled with an unsurpassed genius for production.

Here's its itinerary and the top secret war construction for which this rugged veteran poured millions of yards of concrete.

Indiana	Hoosier Ordnance Plant (shells).
Texas	Lone Star Ordnance (shells and powder).
Utah	Navy Supply Base.
Washington	Hanford Engineering Works (the atomic bomb).
Arkansas	Government Ordnance Plant (rocket powder).

Incidentally, on all these war projects it was the Kolinsky Concrete Co. of Milwaukee which was in immediate command of "Operations Concrete."

And now — far from retirement, that veteran BUTLER Central Mixing Plant is *paying* a bonus by pouring concrete for a power dam at Ladysmith, Wis.

All of which proves that BUTLER *Engineered Design* also pays a bonus far beyond expectation.

For complete descriptions of BUTLER Ready Mixed and BUTLER Central Mixing Plants write for Bulletin 185.

BUTLER BIN COMPANY

947 BLACKSTONE AVE. WAUKESHA, WISCONSIN

CONSTRUCTION REPORTS-Second Section

WATER SUPPLY

BIDS ASKED

O Youngstown and S Niles

Kan Russell

N. Y., Newark

B. C., Vancouver

Conn., Bristol

Tex., Baird

Ia., Grand Junction

Tex., Houston

Tex., Houston

LOW BIDDERS

Calif., Long Beach

Calif., Mariposa

† Calif., Oceanside

Ia., Dubuque

† Md., Camp Detrick

Md., Sykesville

Md., Towson

O., Dayton

O., Mount Gilead

Okla., Ardmore

† Tex., San Antonio

CONTRACTS AWARDED

Ala., Tuscumbia

Fla., Jay

Ga., Athens

Ill., West Chicago

Tex., Houston

Tex., Lubbock

Tex., San Antonio

Ont., Toronto

Que., Quebec City

SEWERS, WASTE DISPOSAL

BIDS ASKED

La., Alexandria

Miss., Meridian

Axtell

Ill., Round Lake

Pa., Bethlehem

Wis., Hayward

Calif., Spadra

Tex., Houston

Tex., Houston

LOW BIDDERS

Calif., Los Angeles

Calif., Los Angeles

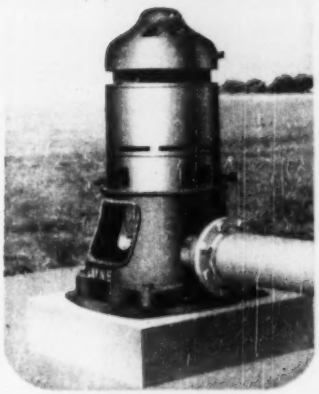
Ca., Sausalito

New York

O., Lancaster

Ore., Hermiston

Ont., Toronto



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You can also be sure of lasting quality! Extensive research for, and the use of the most suitable metals for all parts has given these famous well water systems an extraordinarily long life under all conditions. Feature for feature, Layne Well Water Systems are acknowledged to be the world's finest. No experienced engineer will question that statement.

Layne will gladly, without obligation, give helpful information on any water supply problem. For further information, literature, etc., address

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GENERAL OFFICES, MEMPHIS 8, TENN.

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VERTICAL TURBINE PUMPS

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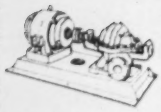
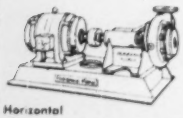


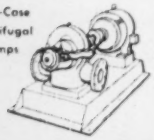
Two-Stage Centrifugal Pumps



Horizontal Sewage and Trash Pumps

Vertical Propeller Pumps

Split-Case Centrifugal Pumps



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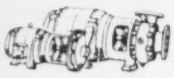
THAT DELIVER

plus performance
lasting dependability
unsurpassed economy

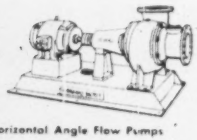
FAIRBANKS-MORSE

A name worth remembering



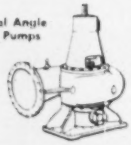
Builtogether Centrifugal Pumps

Vertical Close-Coupled Sewage and Trash Pumps



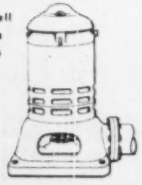
Horizontal Angle Flow Pumps

Vertical Angle Flow Pumps



Vertical Sewage and Trash Pumps

Deep Well Turbine Pumps



Ind. & Heating Co., 2215 W. 5 St., Portland, $105,-096. CD 5-24.

Tenn., Nemphis City, City Hall. Sect. 3, Harrison Creek Outfall Sewers, from J. H. Barr, 2484 Southern Ave., $79,797.

Wash., Seattle—City Lgas. Bldg. for Parker & Turner, Inc., 1918 Fourth Ave., $4,323. Bldg. for Lee Lewis, 2 Yesler Way, $7,960. Bldg. for Mr. Lewis, 2 Yesler Way, Mac Mullaney, 1911 23 Ave., $152,222 ... $71,436 ... Bids 6-19.

CONTRACTS AWARDED

Calif., Sacramento—Sacramento Co. Court House, Sacramento, $60,044. Bids 6-21.

Mass., Lenox—PLANT: Two 82' Seventeen Town Hall, Brick Veneer, Lenox Dental Plant, 1,000 ft. Brick Sheet Piling, Steel Trusses, for Lees to Gaudet & Linehan, for Pittsfield, $50,000 ... Bids 6-21.

Okla., Oklahoma City—City Hall, Sect. 2, Municipal Court Building, Oklahoma City, $241,278 ... $239,844. Addition to Fire Station No. 1, Oklahoma City, $200,000 ... Bids 6-20.

R. I., Lincoln—Lgas. Bldg. for Board of G. Kinsley, Providence, $7,000. Bldg. for Mr. Michael Addition to Dwelling, Lincoln, $5,000. Bldg. for Mr. Fuscone, Approx. $200,000 ... Bids 6-20.

Tex., Houston—Sewers, Sewerage and Drainage Bldg., Contract 4, for Houston Contracting Co., $62,000 ... Bids 6-20.

Tex., Lubbock—Improvements to Municipal Airport, Lubbock, $69,000. Sewers, Sewerage and Drainage Bldg., Contract 4, for Houston Contracting Co., $62,000 ... Bids 6-20.

Tex., Quanah—Improvements to Municipal Airport, Quanah, $90,000 ... Bids 6-20.

N. S., Halifax—Water Supply Improvements, for Halifax & Dartmouth Water Commissioners, $54,334. F. C. Wood, Bdr., Halifax ... Bids 6-19.

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

July 11
Wisconsin

July 14
Kansas

July 18
California

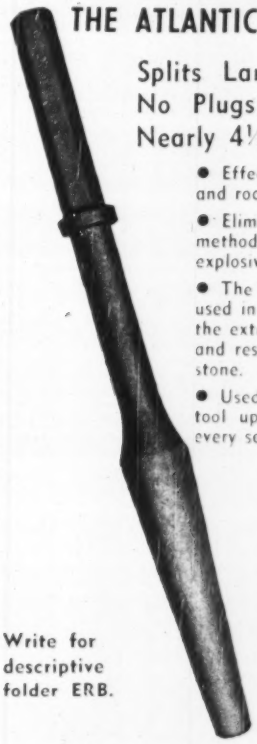
LOW BIDDERS

Illinois—State Hy. Dept., Springfield, June 20, 21 bridges, Jackson County, Section 21, Route 13, Section 21, Route 13, Section 21, Route 13

ATLANTIC Pneumatic TOOLS

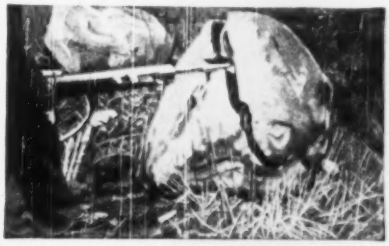
Use with your standard power pavement equipment . . . .

THE ATLANTIC PNEUMATIC ROCK BREAKER



Splits Large Rocks and Boulders quickly
No Plugs and Feathers — No Explosives
Nearly 4½ times faster

- Effective quick action in removing stones, boulders and rocks from excavations and ditches.
- Eliminates the slow and costly plug and feather method, and the risky and troublesome use of explosives.
- The specially heat-treated Atlantic Tool Steel used in the Atlantic Pneumatic Rock Breaker gives it the extreme toughness to withstand the severest usage and resist breakage regardless of the hardness of the stone.
- Used with standard power pavement breakers. No tool upkeep. Tougher than any stone. A size for every service.



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Non-tempering tool steels for greater safety and speed.

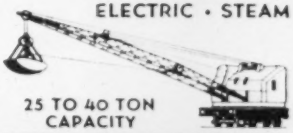
ATLANTIC STEEL CORP. 1775 BROADWAY, N. Y. 19

Hayward Buckets

Use this Class "E" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials.
THE HAYWARD CO., 48-50 Church St., N. Y.

OHIO LOCOMOTIVE CRANES

GASOLINE • DIESEL
ELECTRIC • STEAM



25 TO 40 TON CAPACITY

THE OHIO LOCOMOTIVE CRANE CO
BUCYRUS, OHIO

Nevada... paving; Hy. Dist. Carson City, U.S. Rte. 50 Highway improvement, U.S. 50 from Connersville, Ut. to Lamoille Rd., Elko Co., to Young & Smith Constr. Co., Beason Bldg., Salt Lake City, Utah, $111,917. Bids 6/22. CD 6/14.

O... Warren... Trumbull Co., Warren, Dist. IV, #4 Dr. Hdqs. to Bower & Taylor Co., Farmdale, $50,116. Awarded 6/14.

† Oklahoma... Eng., P. O. Box 61, Tulsa, access road to the Oologah Dam site on Verdigris River, Rogers Co., to Sherwood Constr. Co., Independence, Kan., $53,911. Est. $56,424. Awarded 6/23.

Okla., Oklahoma City... City, City Hall, asph. pavement, Dist. 1120, to Metropolitan Paving Co., 100 S. Independence St., Zone 4, $79,223. Est. $79,245. Awarded 6/20. H. C. Chase, Municipal Bldg., engr. CD 5/15.

Ore., Albany... City, City Hall, 2nd, 1st, 3rd, streets, to Warren Northwest, Inc., 9660 N. E. Holman St., Portland, $55,435. Harold W. Poling, City engr. CD 6/14.

Pennsylvania... State Hy. Dept., Harrisburg, widen pavement with bituminous concrete, 22 ft. and variable, with replacement of portion existing pavements, sidewalks and curbs, and for misc. work, I-R 446, Sec. L, R. 330, 10 mi. E. of S. R. 52, from point in Pleasant Hills Boro. to point in Whitehall Boro., Allegheny Co., to Allegheny Asphalt & Paving Co., 801 Bing. Rom Bldg., Pittsburgh, Zone 1, $699,954. Bids 6/9, awarded 6/20. CD 6/15, under LB.

Tex., Houston... Moses Strickland, 2nd Union Natl. Bank Bldg., street conts. and asph. paving, Exley Bonds. Approx. $65,000. Henry L. Johnson, 5215 Kirby Dr., engr.

Tex., Lubbock... Urban Development Corp., c/o Sam Lemon, Lubbock street, curb and gutter, and asph. paving, various. Approx. $70,000. Parkhill, Smith & Cooper, 141 Avenue J, engrs.

Tex., Odessa... City, asph. street paving, repairing, improvements. $110,000. Joe K. Ward, Natl. Bldg., Wichita Falls, engr.

† Washington... Bureau Public Rds., Dpt. Commerce, Morgan Bldg., Portland, Ore., let roadway, 22.5 mi. Morgan Hy., Lewis Co., to J. E. N. & M. J. Conley, 4432 N. E. Royal Court, Portland, Ore., $345,561. Bids 6/22. CD 6/14.

EARTHWORK, WATERWAYS

BIDS ASKED

† Kansas... U.S.A., 7-11, U.S. Eng., 631 Davidson Bldg., Kansas City, Mo., approx. 11,140 cm. ft. dike and river revetment, Fairport, Kansas, to Bee Creek, Perth, Kan., CIVENG 24-208-50-167.

Minn., Wisdom... B.A., 7-11, Cottonwood Co., J. J. Cortland, Auditor, County Ditch 19, about 150,778 cu. yd. excav., furnish, install 248 lin. ft. 30 in. reinforced concrete culvert, 988 lin. ft. 8 in. to 24 in. plain metal culvert, 16,212 lin. ft. 6 in. to 24 in. tile, etc., $36,000.

† Maryland... B.A. (In Or About) 7-12, U.S. Eng., 24 St. and Maryland Ave., P.O. Box 1715, Baltimore, Zone 3, dredging at Dick Point Cove on east shore of Fox Creek, approx. 25,500 cu. yds.; Dorchester Co.; and maintenance dredging at Fishing Creek on west side of Chesapeake Bay at Chesapeake Beach, 26 mi. south of Annapolis, Calvert Co., CIVENG 18-020-50-44.

† Iowa... B.A., 7-12, U.S. Soil Conservation Service, 444 N. Plankington Ave., Milwaukee, Wis., flood control works on tributaries of Mud Watershed in Clinton, Jones, Jackson, near Quarry.

Louisiana... B.A., 7-12, Livingston Parish Police Jury, Livingston, 441,100 cu. yd. channel excav.

La., Monroe... B.A., 7-12, Ouachita Parish Police Jury, approx. 945,000 cu. yd. channel excav.

Que., Petit Cap... B.A., 7-12, Acting Secy.-Dpt. of Ex. Council Bldg., Ottawa, Ont., breakwater extension, Approx. $12,000. Plans deposit $20. H. Blais, Dpt. owner engr.

▲ Michigan... B.A., 7-13, State Hy. Dpt., Lansing, let excav. and constr. ferry slip at Milwaukee Ave., Antrim Co., ferry dock at St. Ignace, Mackinac Co., $1,700,000. Plans deposit $5.

† Missouri... B.A., 7-13, U.S. Eng., 601 Davidson Bldg., Kansas City, Mo., 12 mile lt. R. dike and revetment, Crowell Bend to Bixler Bend, Waverly, CIVENG 24-278-50-169.

† Washington... B.A., 7-13, Bureau Reclamation, Box 1609, Yakima, rehabilitation Kachess dam and appurtenant works, Kachess River, Yakima River Basin, Kittitas Co., to Peter Kiewit Sons' Co., 14 N. Michigan, Chicago, Ill., & Peter Kiewit Sons' Co., 1423 Harney St., Omaha, Neb., J. F. Driver, Federal Center, Denver, Colo., engr.

† Louisiana... B.A., 7-14, U.S. Eng., foot of Poydras St., New Orleans, Zone 13, revetment of bks. on Mississippi River, Carrollton Levee, Carrollton, Orleans Parish, 7,441 cu. yds., CD 4-11, under LB.

LOW BIDDERS

California... State Div. Water Resources, P. Wks. Bd. Sacramento, June 21, impvmt., Sutter Bypass, Dam at Colusa, State Hdqs., Sacramento, to Thomas Bros., 1718 M St., Sacramento, $72,303.

† Calif., Fort Ord... U.S. Eng., 180 New Montgomery St., San Francisco, 24,000 cu. yds. earthwork, Ft. Ord, Monterey Co., to Ray Wood, Box 900, Watsonville, $126,745.

† Colorado... U.S. Eng., 2nd Ra-Wake Exchange Bldg., Denver, June 13, Cherry Creek, Cherry Creek Reservoir, Flood Control, Cherry Creek Dam and Reservoir, Unit No. 1-A, Denver, to Morrison Construction, 725 S. Wadsworth Ave., Denver, $146,119.

† Louisiana... U.S. Eng., Dist. of Pontchartrain, St., New Orleans, Zone 13, June 14, approx. 1,300 lin. ft. standard board revetment, Red River, Rapides Parish, Contract No. 1-047-50-282, from Hough Cowan & Co., Inc., 220 N. 4 St., St. Louis, Mo., $108,375. CD 6/14.

† Louisiana... U.S. Eng., Box 60, Vicksburg, Miss., June 20, approx. 314,000 cu. yds. earthwork, placing, approx. 450 sq. yds. grav. surf., installing 244 lin. ft. 24 in. and 36 in. culverts, on right bank, Macon & River, Quachita Parish, Inv. No. 1169, from Hobbs & Swilley, Inc., Bossier City, $54,644. CD 6/6.

Md., Baltimore... City, Bureau Harbors, foot of Broadway, June 21, harbor dredging, Patapsco River and approaches, from Anchorage Corp., Pier 2, Pratt St., $66,240. CD 6/28.

† Oregon... City, 528 Pittock Block, Portland, Zone 5, received to 8:00, June 22, dredging, casing, developing water supply well, for city of governments, sewering, and... Lane Log, Box 1649, Eugene, Ore., CD 5/5.

† Washington... U.S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, June 23, right bank impvmt., Mud Mountain Dam, Limestone Pit, to Dan Hoke, M. A. Dolan & Sons, Box 1217, 11 Ave., W., Seattle, $591,280.

▲† Washington... Bureau Reclamation, Dpt. Interior, Rock Springs, June 26, constr. Big Sandy Dam and Diversion System, on Big Sandy Creek about 13 mi. northeast of Eden, Green River, Lake Water Co., spec. 2022, from A. J. Grieves & Sons, Box 1, Kemmerer, Wyo., Bldg. Minneapolis, Minn., $1,011,773. CD 6-5.

CONTRACTS AWARDED

Calif., Martinez... Contra Costa Co., Bd. of Regents, reinforcing wall on Alhambra Ave. in Alhambra Valley, to R. Peterson & Son, 7619 Dam Rd., Pittsburg, $33,681. Awarded 6/19. Jos. V. Barsky, Pub. Works Director, Martinez, engr.

† Missouri... U.S. Eng., Box 103, Memphis, Zone 3, 1 mile dike, approx. 1,000,000 cu. yd. earthwork, St. Johns Bayou and Drainage Dist., Mississippi and New Madrid Counties, CIVENG 40-041-50-139, to H. N. Hoppes & Sons, Dr. 82, Memphis, Tenn., $359,998. Bids 6/16. CD 5/17.

† Oregon... U.S. Eng., Pittock Block, Portland, 1,000 cu. yds. tunnel and shore drain at western end of Lookout Point Dam, Lookout Point Reservoir, Lane Co., 1,450 cu. yds. concrete, 332 lin. ft. 36 in. steel pipe, to General Constr. Co., 6800 N. Wabash Ave., Portland, $77,410. Bids 6/20. CD 5/24.

Tex., Lubbock... Urban Development Corp., c/o Sam Lemon, Lubbock, earthwork, curb, drainage, pavements. Approx. $42,000. Parkhill, Smith & Cooper, 141 Avenue J, engrs.

AIRPORTS

BIDS ASKED

Tex., San Antonio... AIRPORT IMPVMT., U.S.A., 7-11, City, city hall, Military Plaza, airport improvement, runway, drainage, paving runways, taxiways, approx. $415,000. Frank T. Driscoll, 117 W. Peace St., engr. CD 5-23.

† Ala., Montgomery... AIRPORT IMPVMT., U.S.A., 7-11, City, City Hall, Air Force base, let Mobile contract, Maxwell Air Force base, to Hall-Kimbrell Constr. Co., Box 1, Montgomery, $1,744,315. CD 6/7.

O., Akron... RAMP, etc., U.S.A., 7-11, City, Municipal Airport, let contract for concrete runway, drainage structures, and related work at Akron Municipal Airport, approx. $100,000. CD 6/7.

† Miss., Vicksburg... HANGAR, U.S.A., 7-11, City, Municipal Airport, let contract for hangar, ramp, and related work at Vicksburg Municipal Airport, to Hall-Kimbrell Constr. Co., Box 1, Montgomery, Ala., $127,000. CD 6/7.

† Wash., Richland... AIRPORT IMPVMT., U.S.A., 7-11, Atomic Energy Commission, let contract for runway, taxiway, and apron, at Richland Airport, to Ralph Hall & Son, Box 8, Richland, Wash., $382,764. Bids 6/21. CD 6/13. tactical air direction center, Seward at General Mitchell Field, Milwaukee, to New Constr. Co., 3303 S. 20 St., Zone 15, $182,000. Bids 6/16.

LOW BIDDERS

† Calif., Hamilton Air Force Base, N.A.A.F., U.S. Eng., 180 New Montgomery St., San Francisco, 22 hangar units, Hamilton Air Force Base, Novato, to Ray Wood, Box 900, Watsonville, $422,747. Engr. Est. $467,032. CD 6/14.

La., New Orleans... AIRPORT IMPVMT., New Orleans Airport, Rte. Municipal Intersection Airport, general... $274,218. from A. $223,139. ... $71,000. from Hayward Baker, Long... Bldg., Washington, D.C., $75,225.

† Tex., Corpus Christi... AIRPORT, U.S.A., 7-11, City, Municipal Airport, let contract for runway, taxiway, and related work at Corpus Christi Municipal Airport, to Rogers-O'Brien Constr. Co., Box 1, Corpus Christi, $206,116. CD 6/23.

† Tex., Corpus Christi... PAVING, U.S.A., 7-11, City, Municipal Airport, let contract for paving and related work at Corpus Christi Municipal Airport, to Rogers-O'Brien Constr. Co., Box 1, Corpus Christi, $550,508.

CONTRACTS AWARDED

† Wis., Milwaukee... HANGAR, National Guard, Bureau Lake Drainage, 2 story, 204x116 ft., steel, 81x63 ft. garage

LATIN AMERICA

Brazil, Rio de Janeiro... Dpt. of State, U.S. Embassy, Rio de Janeiro, U.S. Embassy Bldg., construction will be handled by four brazilian contractors: Saraiva Coure & Cia. Ltda. as general contractor; Empresa Brasileira de Engenharia S.A., plumbing and electrical work; Elevadores Otis S.A. elevators and General Electric S.A. air conditioning. CD 7/3.

PUBLIC BUILDINGS

BIDS ASKED

Mass., Wormborough... SCHOOL, B.A., 7-11, Town Hall, Wormborough, 8 story, Event, 12-classroom school, Plans deposit $50. Curtiss F. Gustavo, 25 Washington Square, Haverhill, archt. 10/21/48.

Md., Elkton... SCHOOL, B.A. 7-11, Cecil Co. Ed. Educ. Court House, 1 story, brick, stone, concrete, steel, irregular dimensions, approx. 450,000 cu. ft. Junior-Senior High School addn., $450,000. Plans deposit $50. Kinney, Wolcott & Assoc., 329 W. 29 St., Baltimore, archts. Asst. Pres. Wolford, 244 N. Charles St., engr. Engr. Fenn Jr., 300 Equitable Terrace, struct. engr. CD 1-6.

Minn., Crystal Bay... SCHOOL, B.A. 7-11, Independent Consolidated School Dist. 22, Winnetka Division, Co. Junior-Senior High School, $700,000. Plans deposit $20, general contract $15, plumbing, ht., 510, elec. heat, work, O. Moffet, Backstrom & Carter, 47 W. Franklin Ave., Minneapolis, archts. CD 5/9, under Minn. Long Lake.

Minn., Mankato... AUXILIARY, B.A. 7-11, State Dpt. Admin., P. T. Pettyjohn, Dir. Purchases, 19 State Capitol, let contract for Auxiliary Trades Training College, $700,000. Plans deposit $10. E. H. Schmidt & Co., Mankato, archts. CD 7-11.

N. Y., New York... HOUSING, B.A. 7-11, New York City Housing Auth., 637 Park Ave., Zone 7, 10th and West Sts., project, heating and ventilating, electrical work, Housing Authority Nathaniel Houses, Proj. N. Y. 1-1, Sect. 1, inc. Bldgs. 1, 2, and 4, on area bounded generally by 7 Ave., W. 128 St., 8 Ave., and W. 127 St. Plans deposit $75.

Wis., La Crosse... RESIDENCE HALL, B.A. 7-11—Board Regents Normal Schools, Madison, 2 story, brick, reinforced concrete, $325,000. Plans deposit $25, Bayley, Seibert & Sorenson, La Crosse, archts. R. C. Reed Madison, state archt. CD 12-19.

Wis., River Falls... RESIDENCE HALL, B.A. 7-11—Board Regents Normal Schools, Madison, 2 story, reinforced brick residence hall, $325,000. Plans deposit $25, Bayley, Seibert & Sorenson, La Crosse, archts. R. C. Reed, Madison, state archt. CD 12-19.

Conn., Newton... LAUNDRY, B.A. 7-12, State, Raymond Diederick, Comptroller, 114 State Capitol, Hartford, laundry, steam, expansion facilities, Proj. B/A 84, Conn. 3 State Hospitals.

La., Monroe... HOUSING, B.A. 7-12, Monroe Housing Auth., VA Terrace Proj., 54 dwelling units and community bldg., Proj. LA 4-1 and LA 4-2, 52, Plans deposit $50. 10-12-21-49.

N. Y., Babylon... STORAGE, B.A. 7-12, Bureau Contracts & Accounts, Albany, storage bldg. for Dist. 10, Plans deposit $30.

▲N. Y., Newton Falls... SCHOOL, etc., B.A. 7-12—Bd. Educ., Newton Falls, Clifton Fine Central School and Boys' Dorm., $1,500,000. Plans deposit $100 and $5. Hobart, Ryan & Sweet, 660 Madison Ave., New York, archts.

N. Y., New York... HOSPITAL, B.A. 7-12, Bureau Contracts & Accounts, Albany, rehabilitation main hospital, Wards, Queens, Plans deposit $10. CD 7-21-50.

O., Canton... HOSPITAL, B.A. 7-12, County Stark Co., Court House, 1 story, addn. to Mercy Stark Tuberculosis Hospital, $500,000. CD 1-6.

Pa., Spring City... PATIENTS and LAUNDRY, B.A. 7-12, General State Auth., 18 and Herr Sts., Harrisburg, general constr., heating, plumbing and electrical, tuberculosis patients bldg. at Pennhurst State School, $600,000. Douglas M. Blum, 23 S. Main St., Phoenixville, laundry bldg., $250,000. Brasser, Kenny & Schuster, 1600 Walnut St., Phila., Zone 2, archts. & engrs. Owner, engr. Plans deposit $20 each. CD 9-22 and 12-23.

Tex., Big Spring... HIGH SCHOOL, B.A. 7-12—Big Spring Independent School Dist., Big Spring Senior High School, $650,000. Plans deposit $30, general, $20 mechanical work. Puckett & French, 505 Petroleum Bldg., archts. CD 4-6.

Tex., Burkburnett... JUNIOR HIGH SCHOOL, B.A. 7-12—Burkburnett Independent School Dist., Burkburnett, Junior High School, $250,000. Plans at... deposit $15. Ray C. Arnold, Nacon Bldg., Wichita Falls, archt.

▲ Va., Norfolk... BUILDING, B.A. 7-12, Pub. Works Officer Headquarters, Fifth Naval Dist., U.S. Naval Base, Norfolk, Zone 11, altering bldg. for Fleet Marine Force at U.S. Naval Base, Cheatam Hexit Annex, No. 2, Plans deposit $10.

N. S., Dartmouth... LABORATORY, etc., B.A. 7-12, A. D. McLeod, Secy. Defence Research Board, Connaught Bldg., Ottawa, Ont., Canada, Defence Research Laboratory and

administration bldg. at Ansell Research Establishment. Tender No. 65-29-50-29. Approx. $275,000. Plans deposit $100. CD 4-24.

Ont., Ottawa—LABORATORY—B.A. 7-12—J. D. McCarthy, Dep. Canadian Commercial Corp., 70 Lyon St., Phase 1, Defense Research Electronics Laboratory, Montreal Rd., Tender GS-29-50-15. Approx. $350,000. Plans deposit $100. CD 4-7-50.

R. I., East Providence—HIGH SCHOOL, etc.—B.A. 7-13—Albert E. Supt. Schools, 100 Grove Ave., 1,500 pupil Senior High School and recreational facilities. Plans deposit $200. Charles A. Maguire & Assoc., 2249 Torres Head Bldg., Providence, engrs. CD 10-25-44.

▲Tex., Galveston—LABORATORY—B.A. 7-14—University of Texas, Eng. Bd. Regents, Austin—5 story, 8-unit, 54x278 ft. reinforced concrete 20th floor structure laboratory, $1,500,000. Plans deposit $50. Mark Lemmon, 1210½ Main St., Dallas, consult. archt., Kenneth Franzheim, 2306 Oakland St., Dallas, engr. CD 11-15.

Ont., London—SCHOOL—B.A. 7-13—R. O. Hawley, archt., c/o Bd. Educ., 3 story, 8-unit, 155x74 ft. addition to H. B. Beal Technical School. Public High School Addns. Approx. $550,000. Plans deposit $50. CD 10-25-44.

Fla., Lakeland—HOUSING—B.A. 7-14—Lakeland Housing Auth., Lakeland, 220 housing units. Plans deposit $50. Thomas V. Talley, P. O. Box 1104, archt., CD 10-27-49.

Calif., Los Angeles—SCHOOL—B.A. 7-14—City Bd. Educ., 1425 S. San Pedro St., Mark Twain Junior High School, 41,500 sq. ft. administration bldg., 13 teach. sp. ft. industrial arts bldg. $700,000. Kaufmann & Stanton, 623 S. Carondelet St., archts. CD 5-2-47.

Calif., Rio Vista—GYMNASIUM—B.A. 7-14—Rio Vista Elementary School Dist., Box 116, Rio Vista, 1 story concrete gymnasium, 1 story frame bldg. garage, after storage room, etc. at Rio Vista School, $125,000. Plans deposit $20. Dragon, Kleinhaus & Hartman, 1320 University Ave., Berkeley, engrs. CD 5-20-49.

▲ Mass., Roslindale—HOUSING—B.A. 7-14—C. T. Riley, chr., Boston Housing Auth., 240 Canterbury St., 3 story, 252 family unit brick & frame, Project No. 200-2. Approx. $2,500,000. Plans deposit $100, refundable (M. A. Dyer Co., 24 School St., Boston, archt. CD 2-9-22.

D., Delaware—ROOT CELLAR etc.—B.A. 7-14—Bd. P. welfare, John H. Lammey, Jr., Columbus, root cellar and zero storage room at Girls' Industrial School.

Tex., Kilgore—AUDITORIUM—B.A. 7-14—Kilgore College, Kilgore, auditorium, $400,000. Plans deposit $25. Boyd & Simpson, Republic Life Bldg., Dallas, archts. CD 5-5-50.

▲ Tenn., Nashville—OFFICE—B.A. about 7-15—State, Nashville, state office bldg., $6,000,000. Hart & Mc Bryde, Cotton States Bldg., archts. CD 11-29-48.

† North Dakota—SUB-STATIONS, B.A. 7-15—Pub. Bureau Reclamation, Dist. Director, Bismarck, construct Rugby, Devils Lake and Jamestown sub-stations, Transmission Div., Missouri River Basin Proj., Rugby sub-station, approx. 1½ mi. south of Rugby, Devils Lake sub-station, stone and brick, city of Devils Lake, Jamestown sub-station, approx. 2 mi. N.E. part of Jamestown Spec. 3102.

▲† Okla., Oklahoma City—HOSPITAL—B.A. 7-18—Veterans Admin., Vermont Ave. between H. and I Sts., 500 bed veterans hospital and treatment rooms, N. E. 14 St. and Kelley Ave. $12,000,000. CD 10-25-45.

† Alaska, Fort Richardson—B.A. 7-18, 7-19, 7-20—Engr. (AFC), c/o PM, Seattle, Wash., Anchorage, 2 story, brunt, reinforcement concrete & steel, reinforcement concrete Enl. Men's Mess Hall, Spec. No. 5721, Inv. No. 595-502-50-27. Plans deposit $50.

† Alaska, Fort Richardson—BACHELOR OFFICERS' QUARTERS—B.A. 7-19—Dist. Engr., AFC, 8th & Yesler Way, Seattle, Wash., Anchorage, two 2 story, brunt, approx. 5,500 sq. ft. frame Bachelor Officers' Quarters, Bldgs. 6012 and 6164, Inv. 595-502-50-28.

▲Md., Baltimore—HOSPITAL—B.A. 7-20—State of Md., Dist. P. Inspctr., 300 Preston Ave., Zone 1, 6 story, reinforcement steel, brick construction, Maternity pavilion, approx. 100 beds, Univ. of Maryland, $2,000,000. Plans deposit $50. Cowin, Snyder & Cowin, 20 E. Lexington St., archts. & engrs., Eqt. & Constr. Inc., 1809 N. Calvert St., engr. CD 7-14.

Md., Silver Spring—SCHOOL—B.A. 7-20—Bd. Educ., Rockville, 2 story, 61x100 ft. and 1 story, 61x100 ft. classroom, brick, cinder block, steel, Lamont Elementary Junior High School, $500,000. Plans deposit $50. CD 4-24.

† Washington—TEST HOMES—B.A. 7-12—Bonneville Power Administration, Dist. Director, 201 N. E. Ave., clearing, drilling test holes and Pole Line Right-of-Way, 2 mi. northeast of Yakima, Spec. R1-951.

LOW BIDDERS

Fla., Key West—SCHOOL—Monroe Co. Sch. Bd., 3 school bldgs. from Sunshine County, Dr., 2121 Patterson Ave., $488,778.

▲Ark., Fort Smith—HOSPITAL—Sparks Memorial Hospital, 1115 S. 8 St., Fort Smith, Keck & Gaines, archts., $1,585,400.

Calif., Chester—HOSPITAL—N. T. Sweeny Hospital Dist., Justice Court Bldg., June 20, 10 bed hospital, etc. from Oregon Co., 770 Fairmont Ave., Fresno, $255,000. Drug at D. Stone & Lou B. Mulloy, 619 Lassen St., San Francisco, archts.

Calif., Corning—HOSPITAL—Corning Memorial Hospital Dist., Corning, June 15, 2 story, brunt, Type 5, 25 bed hospital, from Moore & Roberts, 693 Mission St., San Francisco, $350,993. CD 5-4-50.

† Calif., Fresno—ARMORY, etc.—B. S. Eng., 180 New Montgomery St., San Francisco, June 22, armory and vehicle storage, Spec. 04-210-50-508, from Oppenheim & King, Box 1923, Fresno, $307,207. CD 6-14.

Calif., San Francisco—SCHOOL—Dist. P. Wks., City Hall, 814, from James Barnes, 750 Folsom St., $714,000. CD 6-1.

† Calif., San Francisco—ARMORY—B. S. Eng., 180 New Montgomery St., June 22, armory and vehicle storage bldg., at Presidio of San Francisco, Spec. 04-210-50-508, from Oppenheim & King, 417 Montgomery St., San Francisco, $387,875. CD 6-14.

Ill., Minonk—SCHOOL—Community High School Ed. 2, 1 story, 92,000 sq. ft. steel, brick, concrete combination school, from T. S. Wirth & Hayes Bldg., Jerseyville, Wis., $420,000. Louis H. Gerding, Ottawa, Ill., archt. & eng., Graham and S. Dearborn Sts., Chicago, Zone 6, engr.

Mass., Haverhill—HOUSING—City of Haverhill Housing Auth., City Hall, Room 4, Spec. 200-2 Veterans Housing, 150 units, from Pierson & Bryan Co., 40 Bridge St., Salem, $699,985. CD 5-23.

▲† N. M., Los Alamos—DORMITORY—U. S. Atomic Energy Comm., Los Alamos, June 12, twenty-two 2 story wood frame dormitories, central heating, from Utah Level Co., Los Alamos, $1,325,983. Est. $1,000,000-$1,500,000. CD 4-24.

N. C., High Point—SCHOOLS—Bd. School Commrs., 900 English St., June 20, 2 school, West Elementary School and East Junior High School, from R. S. Stewart & Son, High Point, $704,000. CD 6-1.

Pa., Torrance—TUBERCULAR PATIENTS—General State Auth., 18 and Herr Sts., Harrisburg, rejected bids May 24, general contract building for tuberculer patients at Torrance State Hospital, Lt. B., $892,000. Will re-advertise. CD 5-24 under LB.

Tex., Beaumont—ENGINEERING—et., Lamar State College of Technology, A. M. McAfee, Jr., Bd. Regents, Beaumont, dorm., engineering, engineers, boiler house, home economics, from Fehlman Labs., Inc., Box 74, Houston, $837,583. Est. $750,000. CD 6-1.

Tex., Houston—POLICE—City, City Hall, 900 Bryan St., June 21, ventilation, plumbing and air-conditioning for 4th police and administration bldg., from Charles J. Heyne Co., 2002 Richard St., $461,461. CD 6-14.

▲Va., Roanoke—HOSPITAL—State of Virginia, Richmond, June 21, Catawba Sanatorium, hospital and Nurses Home, from N. S. Bowles & Son, 209 W. Salem St., Norfolk, $1,115,000. CD 5-17.

CONTRACTS AWARDED

▲ Calif., San Francisco—HOSPITAL—Bd. Regents, University of California, Berkeley, general contract 12 story, basement, reinforced concrete, Medical Center, teaching hospital, Unit 1, Mary Conrad Center, Clinic Center, Co., 923 Folsom St., San Francisco, $5,075,000, heating and ventilating to Marshall Mfg. Co., 43 Layne Pl., San Bruno, $742,247. Bids 4-19. CD 4-19, under LB.

▲ Fla., St. Petersburg—HOSPITAL—Co., Mound Park, mod. to 181 bed, A. F. Lewis, Archt., 209 W. 4 St., Clearwater, N. C., $2,661,500. Bids 6-14. CD 6-22 (corrected).

Ill., DeKalb—RESIDENCE HALL—State Armory Bldg., Connecting, general contract, Men's Residence Hall, Northern Illinois State Teachers College to Federal Nursery & Construction Co., 223 W. Madison St., Chicago, Ill., Zone 6, $751,911. Bids 5-16, awarded 6-19. CD 6-21, under LB.

La., Port Sulphur—SCHOOL—Plaquemines Parish School Bd., P. O. Box 1022, 58 W. Merrick, New Orleans, $699,995. Bids 6-13. CD 6-15, under LB.

▲† N. M., Los Alamos—BUILDINGS—U. S. Atomic Energy Comm., Los Alamos, Kellogg, Box 1663, Albuquerque, N. M., $2,062,601. Bids 6-15. CD 6-26, under LB.

▲ N. M., Los Alamos—DORMITORY—U. S. Atomic Energy Comm., Los Alamos, twenty-two 2 story wood frame dormitories to Utah Level Co., Los Alamos, $1,325,983. Est. $1,000,000-$1,500,000. Bids 6-12. CD 4-24, under LB.

N. C., Chapel Hill—SCHOOL OF COMMERCE—University of North Carolina, Chapel Hill, Bd. Trustees, Gen. Admin. Bldg., A. Reynolds, Jr., Bd. Trustees, School of Commerce, Bldg. A, Bd. Trustees, A. Jones Construction Co., 200 W. 2 St., Charlotte, $968,100. Bids 6-13. CD 6-19, under LB.

▲ N. C., Raleigh—OFFICE—State Hy. & P. Bd., Raleigh, Highway Bldg., Wade Ave. Ext. Thompson & Creech, 400 Oberlin Rd., Raleigh, N. C., Atlanta, Ga., $1,443,672. Bids 6-22, awarded 6-26. CD 6-27, under LB.

Okla., Stillwater—HOME ECONOMICS—Housing & Home Economics, Oklahoma A. & M. College, Bd. Regents, Agricultural & Mechanical College, Stillwater, Okla., Bldg. & Bldg., Kaiser Co., Oklahoma City, Zone 2, $723,268. Bids 6-20. CD 6-20, under LB. Plumbing, Wilder Smith-Miller Co.

Ore., Corvallis—ANIMAL INDUSTRIES—Dreger, Bd. Higher Education, Salem, Oregon State College to Donald M. Drake, Lewis Bldg., Portland, $711,770. Est. $650,000. Bids 5-2, awarded 5-13. CD 5-26, under LB.

S. C., Chester—HOSPITAL—Chester Co., Chester, Bd. Pilot to Hester & Associates, Chester, Archts. Bids Greenville, $746,740. Bids 6-6. CD 6-24, under LB.

Wyo., Casper—SCHOOL—School Dist. 2, High School Bldg., Casper, 1 story, brick, 220x240 ft. Willard School addn., 1 story, 14x42½ ft. Grant School addn., and 1 story, 110x249 ft. Garfield School addn., to Cahill-Manley Constr. Co., 503 E. 2 St., $741,800. Bids 6-13, awarded 6-13. CD 5-25.

▲ Ont., Port Arthur—HOSPITAL—Dist. P. Wks., Tuberculosis hospital, reception and kitchen wing, additions 6-1 and M-1, and power house, to Barrett-McGeera Ltd., 140 Cumberland St., Fort William. Approx. $1,500,000. CD 6-2.

COMMERCIAL BUILDINGS

BIDS ASKED

Tex., Marshall—DORMITORY—B.A. 7-13—East Texas Baptist College, Marshall, 204 student capacity boys dormitory, $275,000. Extended date, Wyatt C. Hendrick, 904 Fort Worth Ave., Dallas, engr. and archt. CD 6-9.

▲ Mich., Traverse City—HOSPITAL—B.A. 7-25—James Decker Munson Hospital, Traverse City, general contract, hospital expansion. Total est. $1,000,000. CD 11-2-44.

Miss., Canton—HOSPITAL—B.A. About 7-31, Kings Daughters Hospital, c/o Trost & Lichte, archts., 204 Barnett-Madden Bldg., Jackson, hospital addn. $750,000. CD 4-7.

Mo., Kirkwood—1st Unitd. 22 P.O.—CHURCH—B.A. About 8-1—1st Presbyterian Church, Rev. Alvin B. Lackey, pastor, 214 W. Argonne Dr., 95x153 ft. brick, steel, concrete church to seat approx. 600 persons, no tower etc. for 1st D. Murphy, 4246 McPherson Ave., St. Louis, Zone 8, archt.

Ill., Madison—CHURCH—B.A. About 4-20—Roman Catholic Diocese, Madison, church, $330,000. Harry J. Hellmuth, Fairmont Med., archt.

Ill., Aurora—Bids Asked MARMION ABBEY—Bids Asked—Benedictine Fathers, Aurora, 1 story, brunt, Marmion Abbey, Inc., 2 chapels, guest rooms, dining room, kitchen, machine shop, carpenter shop, on 230 acre site, $350,000. Leo J. Relli, 7 S. Dearborn St., Chicago, archt.

▲ Nev., Las Vegas—HOTEL—Bids Asked—Desert Inn, c/o Wilbur Clark, Las Vegas, 125 room hotel addn., $1,250,000. Jack Lessman, Co. owner, archt. CD 6-22.

Tex., Corpus Christi—COMMERCIAL—Bids Asked—G. R. Swantner, S. Alameda at commercial, Alameda, Mainesco Commercial, $300,000. commercial units at N. Ports, $300,000. CD 4-7.

Wis., Madison—APARTMENT—Bids Asked—Lake Shore Apartments, Inc., Frank Riley, pres., 109 W. Main St., 6 story, brunt, 50x170 ft. reinf.-con., brick apartment.

SOON LETS CONTRACT

Ill., Lisle—DORMITORY—St. Procopius College, Lisle, soon lets contract 3 story 40,000 sq. ft. dormitory, $500,000. Paul P. Sekavec, 76 Lasalle St., Chicago, N. J. archt.

O., Lakewood—CHURCH—Leo J. Burrett, archt., 504 Caxton Bldg., Cleveland, soon lets contract 1 story brunt, brick, stone church and educational bldg. for Lakewood Christian Church, Detroit and Riverside Sts. $260,000. CD 12-9.

Tex., Austin—HEADQUARTERS—Texas State Teachers Assn., C. H. Yelvington, exec., Littlefield Bldg., soon lets contract headquarters, Approx. $350,000. Page, Southerland & Page, archts. CD 6-19.

▲ Tex., Dallas—HOSPITAL—St. Paul's Hospital, soon lets contract 4 story brunt, approx. 54,000 sq. ft. addition and alterating existing unit, $1,700,000. Plans deposit $25. M. C. Kleiner & B. W. Simpson, 2815 McKinney, archts. CD 6-23.

Tex., Waco—HEADQUARTERS FACILITIES—Brazos River Transmission Electric Cooperative, Waco, soon lets contract 2 story, 36x90 ft. headquarters and 1 story, 36x90 ft. warehouse, Page, Southerland & Page, Medical Arts Bldg., archts. CD 2-3.

Fla., Winter Haven—CHURCH—First Methodist Church, Burket & McMurry, archts., 5113½ W. Church Ave., Knoxville, Tenn., soon lets contract church, $244,000. CD 6-7.

LOW BIDDERS

Ala., Birmingham—OFFICE—First Chemical Steel & Supply Co., 1 story, veneer, Dean & Co., archts., American Life & Accident Ins. Co., from J. F. Holley, 905 6 Ave. N., $284,000. CD 6-12.

Fla., Fort Lauderdale—HOTEL—Phoenix Investment Co., Robert M. Lottie & W. G. Crawford, 329 S. E. 8 Ave., from Carbaugh Const. Eng. & Constr. Co., 140 S. E. 24 St., Augusta, $300,000.

Ill., Cairo—HOSPITAL—Sisters of the Holy Cross, c/o Sister M. Hyacinth Fraricks, Supervisor, St. Mary's Hospital, 1 story, 1 general contract item for brick, steel stone hospital, from M. Gatty Brothers Contractors, 2900 Delmar Blvd., St. Louis 8, Mo., $686,390. CD 7-18-48.

▲ N. C., Cullowhee—SCIENCE CLASSROOM, etc.—West Carolina Teachers College, Cullowhee, June 22, science classroom bldg. and library from J. A. Jones Constr. Co., 204 W. 4 St., Charlotte, $1,135,600. CD 6-1.

▲ Pa., Harrisburg—HOSPITAL—Harrisburg Hospital, Forster and Mulberry Sts., June 2, Harrisburg Hospital

Alterations, addns., 2 Front St. from Ritter Bros., Bldr., N. Cameron St., $2,358,032. CD 6/16.

Tex., Dallas—Y.M.C.A. BLDG.—Park Cities Young Mens Christian Assn., c/o Felix R. McKnight, 6326 Westchester St., June 8, Y. M. C. A. bldg., Park Cities, East Bateson Constr. Co., Irwin Keasler Bldg., $298,686. CD 5/24.

▲ Tex., Randolph Field (San Antonio)—HOUSING—Fourth Army Headquarters, Fort Sam Houston, constr., manage and finance 500 housing units for military personnel, from Murchison Bros., 1315 Pacific, Dallas. Approx. $5,000,000. Wagner & Altschuler, Dallas, & Paul U. Evans, archt.

CONTRACTS AWARDED

▲ Calif., Compton—DWELLINGS—Sunset Gardens Co., 6300 Wilshire Blvd., Los Angeles, 275 single dwellings, in tract 6550. Owner builds. $1,504,500.

Calif., Concord—RESIDENCES—Morgan, Inc., in 25 MacArthur Blvd., Oakland, 79 residences in Gregory Gardens, E. of Pleasant Hill area here. Owner builds. $553,000.

Calif., San Rafael—RESIDENCES—A. E. Nolan Co., 405 San Antonio Ave., San Francisco, 25 single residences in Dominican Gardens. Owner builds. $700,000. Frank Aitken, Jr., 1 San Marcos St., Larkspur, engr.

▲ Fla., Cocoa—HOUSING—Jollyn & Lowe, Inc., 1445 East St., Jacksonville, Zone 1, construct, manage and finance 180 family unit housing project for Navy personnel, from Water Works. Approx. $2,000,000. Awarded 6/23.

Fla., Fort Lauderdale—RESIDENCES—Fort Lauderdale Investment Co., N. W. 15th St., Miami, 48 residences and duplex units. $300,000.

Fla., Miami—HOMES—N. Seven, Inc., c/o contractor, Home to Suit Homes Co., 11700 N. W. Ave., Miami. $400,000.

▲ Ill., Evanston—STORE—Henry C. Taylor & Co., Builders and Contractors, steel, stone and brick store, for Wm. F. Schweitzer, 2207 Dodge St., Evanston. $1,000,000. Bids 6/28, awarded 6/29.

Ia., Davenport—HOSPITAL—St. Lukes Hospital, 2720 Fillmore St., addn. to general hospital, 5 story hospital addn., to Temple & Constr. Co., 126 Fillmore St. $812,600.

Md., Baltimore—APARTMENTS—National Realty Co., 21 St. & 2 story brick, 12x14 addn. to 3 story brick, 14x42 & masonry residence, 14x42 & 2½ story brick, 14x42 & masonry residence, 14x42 & 2½ story brick apartments, Guilford Ave. & 21st St., Owner builds. $325,000.

N. J., Elizabeth—APARTMENTS—Kingsland Apartments, Inc., 41 Broad St., Elizabeth, 3 three & two 2 story brick apartments, Rosella Pl., Owner builds. $325,000.

▲ N. J., Elizabeth—APARTMENTS—Syndicate, c/o Harvey Fiske & Sons, Inc., 11 Park Pl., New York, 2 story brick apartments, 2141 Raymond Blvd., Newark, 2 story apartments, 1174-1184 South Ave., and 2 story apartments, Rosella Pl., Owner builds. $1,248,000.

N. J., Hackensack—SHOPPING CENTER—B. G. & S. Center and Westview Ave., 100 stores, shopping center, with 1½ story brick stores, Owner builds. $500,000. Peter H. Hutton, 1 W. Ridgewood Ave., Ridgewood, engr.

N. J., Red Bank—HOUSING—Monmouth Housing Co., 1 Broad St., Red Bank, 100 family unit housing project, Owner builds. $668,400. Bids 6/21.

N. M., Albuquerque—HOUSING—Public Housing Authority, 1 Civic Plaza, 100 family unit housing project, Owner builds. $764,000.

N. Y., Jamestown—HOSPITAL—Jamestown General Hospital, Inc., 207 Foote Ave., addn. to hospital, Owner builds. $750,000.

▲ N. Y., Brooklyn—APARTMENTS—Nathan Perlbinder, 1 Union Sq. W., New York, 2 story brick apartments, Ave. A & Avenue P, Owner builds. $1,500,000.

▲ N. Y., Massapequa Park—APARTMENTS—Nassau Realty Co., 1 Union Sq. W., New York, 2 story brick apartments, Owner builds. $2,000,000.

▲ N. Y., Minoa—HOUSING—Public Housing Authority, 1 Civic Plaza, 100 family unit housing project, Owner builds. $1,000,000.

N. Y., New Rochelle—APARTMENTS—Mrs. Ida Rosenberg, 1 Union Sq. W., New York, 2 story brick apartments, Owner builds. $400,000.

N. Y., New York—APARTMENTS—Fifth Ave. Realty Co., 1 Union Sq. W., New York, 2 story brick apartments, Owner builds. $500,000.

▲ N. Y., New York—APARTMENTS—Herman Berlinger, 1 Union Sq. W., New York, 2 story brick apartments, Owner builds. $2,000,000.

▲ O., Euclid—HOMES—Douglas Corp., Austin & Young, Inc., Builders, and Jane Builders, Inc., Cleveland, 2 story brick, frame & masonry single dwellings, Owner builds. $3,150,000.

Pa., New Kensington—HOSPITAL—Citizens General Hospital, New Kensington, June 13, 4 story brick, steel hospital addn., from Bernard Martin, Inc., 6230 Penn Ave., Pittsburgh. $748,666. CD 6/2.

Pa., Pittsburgh—APARTMENTS—Vue Apartments, Inc., Nos. 1 and 2, 704 Washington Rd., 2 and 3 story brick, frame & masonry apartments and garage, Leland Park, Owner builds. $750,000. Philip Friedman, 1441 W. Negley St., archt.

Tex., Dallas—DWELLINGS—A. L. Ladd, 1015 McLean Ave., 3 dwellings, Day labor. Approx. $550,000. CD 6/9.

▲ Tex., Galena Park—DWELLINGS—Frank Teague & Co., 1 Avil, Union Natl. Bank Bldg., Houston, 175 dwellings, Owner builds. Approx. $1,225,000. CD 6/5.

Tex., Houston—RESIDENCES—A. E. Bailey, 3016 Jarrard St., 219 Negro residences, own forces. Approx. $990,000. CD 5/17.

Tex., Houston—SHOPPING CENTER—Berne Constr. Co., 1312 Preston St., shopping center, Owner builds. Approx. $310,000. CD 4/17.

Tex., Lubbock—HOUSING—Spring Rental Houses A, Inc., 114 N. College, 50 family housing units, Owner builds. Approx. $280,000. CD 6/7.

Tex., San Antonio—DWELLINGS—Basile Hurley, Inc., Hasse Rd., 50 dwellings, Owner builds. $350,000. CD 6/8.

▲ Tex., San Antonio—DWELLINGS—A. W. Browning, Jr., 1122 Insurance Bldg., Dallas, 220 dwellings, 50 acre tract off A. & G. W. Ry. and St. Hedwig Rds., Owner builds. Approx. $1,000,000. CD 4/25.

Tex., San Antonio—DWELLINGS—Bldg. Tex. Builder, Inc., 11 Main Plaza, 100 dwellings, Owner builds. Approx. $700,000. CD 6/9.

Tex., San Antonio—SUPERMARKET—Piggly Wiggly Co., 1 Butt Grocery Co., 1 Main Ave., 1 supermarket in the suburbs, Owner builds. Approx. $250,000. CD 11/11.

Tex., San Antonio—HOUSING—Lowry, Carr & Harris, 1 Travis Bldg., private housing project, Owner builds. $275,000. CD 6/14.

Va., Richmond—HOUSING—Housing Authority, Real Estate Inv. Bldg., 100 family unit, 168 room, Owner builds. $700,000.

Wis., Rhinelander—HOSPITAL—Addn. to Rhinelander Hospital, 2 story addn., to hospital, 1 & 2 story, part basement, 45x117 ft., steel frame, brick & stone, Thomson-Abbott, Constr., 211 Capitol St., Marshfield. Approx. $250,000. Bassett & Hetzel, Architects, 1 Lee Ave., Sheboygan, archts.

Wis., Sheboygan Falls—HOSPITAL—Addn. to Memorial Hospital, 2 story addn., to hospital, 42x66 ft., Congregational Sheboygan Falls, Owner builds. Approx. $275,000. F. A. Bassett, Architect, 1 Lee Ave., Sheboygan, archt.

Alaska, Anchorage—APARTMENTS—Jefferson Court Apartments, 2 story brick apartments, Owner builds. Seattle Weld Co., Seattle, Wash., subcontractor for steel. Alaska Day Labor Service, Anchorage, Alaska, contractor. $949,000. Bids 6/16. CD 6/2.

INDUSTRIAL BUILDINGS

BIDS ASKED

Fla., Miami—[illegible]

Ill., Chicago—[illegible] $250,000.

Mass., Cambridge—[illegible]

Tex., Port Arthur—[illegible]

Tex., Waco—[illegible]

Que., Quebec City—[illegible]

SOON LETS CONTRACT

Ala., Florence—[illegible]

▲ Wash., Grand Rapids—[illegible]

O., Cleveland—[illegible]

CONTRACTS AWARDED

Calif., Sacramento—[illegible] $300,000.

Ill., Chicago—[illegible] $60,000. Awarded 6/23.

▲ Ill., North Chicago—FACTORY—Deep Freeze Div., Motor Products Co., 23,000 sq. ft., steel, concrete, brick factory, to The Austin Co., 510 N. Dearborn St., Chicago, Zone 10. $2,000,000. Awarded 6/19.

Ill., Springfield—PLANT—Baker Mfg. Co., 10 St. and Stanford Ave., 10,000 sq. ft. plant addn., to E. R. Jones, 1030 W. Reynolds, $150,000. Murray S. Hanes, 2051½ S. 6 St., archt.

Ind., Garrett—FACTORY—Hubbard Spool Co., substructure, 47,000 sq. ft. factory, to Hudson & Uhl, Kendallville, Est. $200,000. Awarded 6/22. Fred Deke, 180 W. Madison St., Chicago, 3, Ill., archt.

O., Youngstown—WELFARE, etc.—Republic Steel Corp., Poland Ave., welfare bldg. and gatehouse, lockeroom bldg., to Heller-Murray Co., 222 W. Raven Ave., $130,000. office and storage bldg., yard office and welfare bldg., shop storage and welfare bldg., and combustion shop and office, to Charles Shutrump & Son Co., 101 W. Hynds Ave., $96,300. Awarded 6/23.

▲ O., Youngstown—WAREHOUSE—Truscon Steel Corp., Albert St., warehouse, W. on St. to Joseph Buchert & Son Co., 814 Mahoning Ave. $500,000. Awarded 6/23.

▲ S. C., Fountain Inn—PLANT—Fairview Mills, c/o contractor, dying and finishing plant, to Daniel Constr. Co., 424 N. Main St., Greenville. Approx. $2,000,000.

Tex., Pasadena—SILO—Matheson Chemical Co., Pasadena, design and construct 60 ft. diam., 80 ft. high silo, to Thomas Bryan & Assoc., Inc., M & M Bldg., Houston, $85,000.

Wis., Manitowoc—FACTORY—Aluminum Specialty Co., Manitowoc, 1 story 150x191 ft., concrete, steel factory addn., to Kasper Constr. Co., 1203 N. 16 St., P. Brandt, 104 N. 8 St., archt.

UNCLASSIFIED

BIDS ASKED

† Colorado and Wyoming—STRUCTURAL STEEL—B.A. 7/11—Bureau Reclamation, Dept. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, delivering cars shipping point or f.o.b. cars Basin, Colo., and Casper, Wyo., fabricated structural steel for Beaver Creek substation, Grizzly Peak substation, Heart Mountain substation, Shoshone Div., Wyo. [illegible] W. Mallender, CE engr.

Newfoundland—Furniture—WHARF IMPROVEMENTS, etc.—B.A. 7/12—Army Dept. U.S., Office Constr. Quartermaster, Bldg. 1, Brooklyn Army Base, Brooklyn, 32, N. Y., Hunter Bldg., Philadelphia, Pa., and Quartermaster, [illegible] Plans deposit $25. R. Bids, 276 items.

† New Mexico—EQUIPMENT, etc.—B. A. 7/13—Bureau Reclamation, Dept. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, delivering cars shipping point or f.o.b. cars Eagle Lake, Colo., Deming and Bayard, N. Mex., of equip. for Elephant Butte Power Plant, for supervisory control and selective telemetering of power interchange at Las Cruces substation, from Elephant Butte Power Plant, and for telemetering to Elephant Butte Power Plant kilowatts of power interchange at Las Cruces substation; one lot equip. for Las Cruces watering station for supervisory control of Las Cruces watering station from Elephant Butte Power Plant; one lot equip. for Deming substation as required to complete Summer Hill supervisory equipment Elephant Butte Power Plant to Deming substation, and selective telemetering of Deming substation; one lot equip. for Central substation for supervisory control and selective telemetering of Central substation from Elephant Butte Power Plant; and one lot equip. for Las Cruces substation for telemetering to Elephant Butte Power Plant kilowatts of power interchange at Las Cruces substation, Eddy, Otero, Sierra, Dona Ana, Luna & Hidalgo Counties, N. Mex. Bids 5/16 rejected.

† Oregon—[illegible]—B.A. 7/13, Bonneville Power Administration, Dept. Interior, Portland, Ore. [illegible] $25. Plans deposit $25.

† Oregon—[illegible]—B.A. 7/13—Bonneville Power Administration, Dept. Interior, Portland, construct Maupin-Tygh Valley transmission line, from Maupin substation, Maupin, to Tygh Valley substation, Tygh Valley, 15 miles, access roads, clearing and cutting right of way, Nine Mile Canyon, Deschutes River & Buck Hollow Creek crossings, Wasco & Sherman Counties, Ore. [illegible]

N. Y., Jones Beach—MARINE STADIUM—B.A. 7/14—[illegible] State Parkways Auth., Albany, Heat, heating, ventilating, air conditioning, refrigeration, boilers, [illegible] Jones Beach State Park, Babylon, general construction, heating, ventilating, electrical work, electric wiring, [illegible] Superintendent of Marine & Aviation, Jones Beach State Park, Babylon, N. Y. Plans deposit $10, general contract, $10, each heating, ventilating, electrical work, $5, [illegible] elevator, [illegible] & Mgr., 1560 Broadway at 47 St., New York 36, N. Y. Zone 21, general, [illegible] and engrs. CD 8/29/49.

California—DAM—[illegible]—B.A. 7/14—State Div. Architecture, P. Way Bldg., Sacramento, [illegible] Sacramento River in Big Basin, Santa Barbara County, [illegible] Architect, P. Way Bldg., Sacramento, [illegible] Mr. [illegible] 1 [illegible] Co., Angeles, [illegible]

California—[illegible]—B.A. 7/18—State Div. Architecture, P. Way Bldg., Sacramento, [illegible] Mendocino County, [illegible] Architect, P. Way Bldg., Sacramento, [illegible] and underground [illegible] Mendocino State Hospital, Area [illegible]

Miss., Boonville—SANITARY SYSTEM—B.A. 7/18—[illegible] Boonville, $75,000. T. O. Mabry, Jr., [illegible] 24

are businessmen

COLD-BLOODED?

OF COURSE NOT! Literally, their normal body temperature is 98.6—same as laborers, engineers or any other group of people. And, figuratively, they're no more, or no less, cold-blooded—as a group.

We all know unreasonable generalizations can be dangerously false. Common sense and on-the-job experience show us the value of dealing specifically with ideas, problems—and *people*.

Let's not make the big—and costly—mistake, then, of generalizing on religious or racial groups. Adopt and *carry out* these common sense principles:

1. Accept—or reject—people on *their individual worth.*
2. Don't listen to or spread rumors against a race or a religion.
3. Speak up, wherever we are, *against* prejudice. Work for understanding.

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N. S. Diepbrook—WHARF REPAIRS—B.A. 7.19—J. D. McCarthy, Navy Canadian Commercial Corp., 70 York St., Ottawa, Ont. wharf repairs, H. M. C. S. Cornwallis. Tender No. 53-20-177. Approx. $60,000. Plans, deposit $25. CD 3/6.

† California—CONTROL BOARD EXTENSION—B.A. 7.23—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. furnishing 4 to 6 cars shipping point of Fort Peck, Mont. to Shasta, Calif. for miscellaneous equipment for 220 kv. Shasta Lines 1 and 2 for Tracy substation, Central Valley Proj., Spec. 3091. L. N. McClellan, dir. engr.

† Colorado—TRANSFORMER—B.A. 7.20—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, transformer, 4-11 single-phase, 60-cycle, 230-kv. primary, 13.8-kv. secondary, 10,000-kva. rating for use for Green Mountain-Big Thompson Proj., Spec. 3091. L. N. McClellan, dir. engr.

† North Dakota—CONTROL BOARD—B.A. 7.20—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, control board for Garrison Diversion Unit, Missouri River Basin Proj., Spec. 3091. L. N. McClellan, dir. engr.

† N. M.—Las Cruces—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, 2 transformers, 1 for Elephant Butte Power Plant, 1 for Caballo Power Plant, Rio Grande Proj., Spec. 3091. L. N. McClellan, dir. engr.

† North Dakota—POWER TRANSFORMER—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, transformer, 4-11 single-phase, 60-cycle, 230-kv. primary, 13.8-kv. secondary, 10,000-kva. rating for use for Garrison Diversion Unit, Missouri River Basin Proj., Spec. 3091. L. N. McClellan, dir. engr.

† Wyoming—SWITCHGEAR—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. furnishing 161-kv. switchgear, 1 for Fort Peck, Mont. shipping point, 1 for Lovell, Wyo. shipping point, 1 for Lake Oahe, Lake Sakakawea, Jamestown, Valley City, Fargo, Fortuna, Williston, and Dickinson, North Dakota, power transformer, voltage regulating transformer, power transformer, neutral grounding transformer, power transformer, station service transformer, 1 for Fort Peck, Mont. shipping point, 1 for Lovell, Wyo. shipping point, 1 for Lake Oahe, Lake Sakakawea, Jamestown, Valley City, Fargo, Fortuna, Williston, and Dickinson, North Dakota, for Garrison Diversion Unit, Missouri River Basin Proj., Spec. 3091. L. N. McClellan, dir. engr.

† Arizona-California-Nevada—SUBSTATION SWITCHGEAR—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. furnishing 161-kv. switchgear, 1 for Las Vegas shipping point, 1 for Boulder City, Nev. shipping section, transformer, transformer, power transformer, distribution panel, for Arizona-Nevada 230-kv. switching station, Arizona-Nevada 230-kv. Switching Station, Spec. 3091. L. N. McClellan, dir. engr.

† Colorado—TRANSFORMERS—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. furnishing 3-phase, 60-cycle, 230-kv. primary, 13.8-kv. secondary, 10,000-kva. rating transformers, for Green Mountain Power Plant, Colorado-Big Thompson Proj., Spec. 3091. L. N. McClellan, dir. engr.

† North Dakota—DISTRIBUTION BOARD—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, control board for Garrison Diversion Unit, Missouri River Basin Proj., Spec. 3091. L. N. McClellan, dir. engr.

† Wyoming—POWER AND LIGHTING—B.A. 7.21—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. furnishing 2-section, 125-volt, 2-battery charger control board and one 125-volt 600-ampere-hour battery, 2-battery charger, 2-section, 125-volt control board and 125-volt 600-ampere-hour battery, for Green Mountain Power Plant, Colorado-Big Thompson Proj., Spec. 3091. L. N. McClellan, dir. engr.

LOW BIDDERS

California—PARK WATER DEVELOPMENT—Bid 7.17—State Park Commission, P. Wks. Bldg., Sacramento, to Ace Rock Drilling Co., 1111 Ashby Ave., Berkeley, and San Leandro Blvd., Oakland, $16,634.

† Calif.—Lathrop—RAILROAD TRACKS—Bid 7.11—Army, Corps of Engrs., Sacramento Engineer District, Lathrop, 23 serial-type Wasco-Hyster diesel-engine locomotive cranes, Army Depot, Lathrop, to Nat'l Supply Co., Tracy, Army Depot, Lathrop, $302,263.

Calif.—San Francisco—TRAFFIC SYSTEMS—Bid 7.13—Traffic Control Bldg., Civic Center, 20 traffic control systems, Nos. 1, 2 and 3, at 13 intersections, from Market to Fell Sts., Van Ness Ave., to Gough St., and Fell St., to Franklin St., to Nat'l Signal Co., 249 Natoma St., $194,322.

Calif.—Stockton—GROUND IMPROVEMENT—State Div. Architecture, P. Wks. Bldg., Sacramento, grand jacking at Stockton State Hospital, by paving to raise existing floor, Stockton State Hospital, Stockton, to Vulcan Foundation, P. O. Box N, Castro Valley, and 1510 Rollins Rd., San Mateo, $51,454. Amon Hoyt, Sacramento, state archt.

† Colorado—TURBINES—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. 15, turbines for Pole Hill and Flatiron Power plants, near Loveland, Larimer Co., Colorado-Big Thompson Proj., Spec. 2749, from Pelton Water Wheel Co., 2432 14th St., San Francisco, Calif., $965,000. CD 6-10.

Fla.—Miami—SWIMMING POOL, etc.—Golden Strand Hotel, Inc., owner, c/o Roy O. Peverley, archt., 250 N. E. 1st St., Miami, June 20, swimming pool and cabana bldg., from Fetterson Bldg. Corp., 634 Lincoln Rd., Miami Beach, $85,938. CD 6-10.

† Idaho—Pocatello—PRIMARY SYSTEM—Pub. Wks. Dept., Thirteenth Naval Dist., 1611 W. Wheeler St., Seattle, Wash., contract let at Naval & Marine Corps Reserve Training Center, R. L. Barr, 1220 Ida. St., Seattle, Wash., $53,321.

La.—Lafayette—ELECTRICAL DISTRIBUTION SYSTEM—City Hall, Box 2, electrical distribution system, Lafayette Municipal Airport, Box 2, electrical distribution system, Lafayette Municipal Park, Box 2, Baton Rouge, $92,900.

La.—New Orleans—AIRPORT—Port of New Orleans, 2 runways, 2 taxiways, involving grading, 825,000 sq. yds. soil cement base, lighting, fencing, 3,000 lin. ft. storm sewer, Moisant Int'l. Airport, from Fenstermaker & Seuzeneau, Inc., 1020 Perdido St., Box 52462, $2,462,000. CD 6-8.

† Arizona—[illegible]—[illegible]—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. [illegible] Proj., Spec. 3091. L. N. McClellan, dir. engr.

North Dakota—RAILROAD DISTRIBUTION LINES—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. [illegible] Proj., Spec. 3091. L. N. McClellan, dir. engr.

$479,223. CD 6-24.

† North Dakota—TRANSMISSION LINE—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. [illegible] Proj., Spec. 3091. L. N. McClellan, dir. engr.

$772,145.

Pennsylvania—[illegible]—Pennsylvania Turnpike Comm., [illegible] Sec. 1, Cumberland Co., [illegible] Sec. 2, Cumberland Co., [illegible] Sec. 3, Cumberland Co., [illegible] Sec. 4, Cumberland Co., [illegible] Sec. 5, Cumberland Co., [illegible] Sec. 6, Cumberland Co., [illegible] Sec. 7, Cumberland Co., [illegible] Sec. 8, Cumberland Co., [illegible] Sec.

OFFICIAL PROPOSALS

APPEAR HERE EACH THURSDAY. PROPOSAL ADVERTISEMENTS ACCEPTED UP TO 10 A.M. FRIDAY FOR THE ISSUE DATED THE FOLLOWING THURSDAY

(Continued from page 108)

(3521)

New Jersey Turnpike Authority

* * *

Sealed proposals will be received by the New Jersey Turnpike Authority for the following contracts:

CONTRACT NO. 52

The work to be performed under this contract involves the construction of the Substructures for four bridges and other incidental work in connection with the construction of the New Jersey Turnpike between Newark Bay and the Elizabeth Interchange in the city of Elizabeth, Union County.

Principal items of work include:

Open Foundation Excavation	10,400 Cu. Yds.
Furnishing and Driving Steel Bearing Piles	24,000 Lin. Ft.
Pile Casings	12,000 Lin. Ft.
Cast-in-Place Concrete Bearing Piles	24,000 Lin. Ft.
Concrete in Foundations, Copes, Footings, Abutments, Wing Walls, Boats and Parapets	5,300 Cu. Yds.
Reinforcement Steel	700,000 Lbs.
Protection of Railroad Traffic	Lump Sum

Contract documents may be seen and may be inspected by prospective bidders during office hours, after June 23, 1950, at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton 8, New Jersey, and at the office of the Engineers, Ammann & Whitney, 165 Raymond Boulevard, Newark, New Jersey, or 79 Ninth Avenue, New York 11, New York.

Contract documents will be furnished for $5.00 for each set upon application to the Authority. The payment will not be refunded and contract documents are not required to be returned.

* * *

Plans, Specifications and Supplementary Specifications of Contract No. 53, Grading and Drainage, 4th Line to Third Avenue, Elizabeth, will be furnished for $2.00 for reference purposes upon application to the Authority, 67 Prospect Street, Trenton 8, New Jersey. The payment will not be refunded, and the Drawings and Supplementary Specifications are not required to be returned.

* * *

CONTRACT NO. 58

The work to be performed under this Contract involves the construction of 18 bridge structures, reinforced portland cement concrete slabs and grading and drainage of a major interchange area.

Location of the work is in the Township of Woodbridge, Borough of Carteret, and the City of Linden, New Jersey, at various sections of the northern 8.5 mile portion of Section 3 of the New Jersey Turnpike from Sta. 101 in Woodbridge to Sta. 762 in the City of Linden.

Maintenance of local, vehicular and railroad traffic is involved. The completion date is July 1, 1951.

Principal items of work are:

Earth Excavation	250,000 Cu. Yds.
Borrow Excavation	240,000 Cu. Yds.
Open Foundation Excavation	35,000 Cu. Yds.
Concrete in Bridge Structures	30,000 Cu. Yds.
Structural Carbon Steel	30,000 Lbs.
Reinforcement Steel	4,500,000 Lbs.
Steel Cast-in-Concrete Bearing Piles	45,000 Lbs.
Reinforcement Steel	4,000 Lin. Ft.
Miscellaneous Concrete and Bituminous Paving	3,000,000 Lbs.
Topsoiling	30,000 Sq. Yds.
Drain Pipe, Various Types and Sizes	30,000 Sq. Yds.
	17,500 Lin. Ft.

Contract documents may be seen and may be inspected by prospective bidders during office hours, after June 23, 1950 at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton, New Jersey, and at the office of the Engineers, Fay, Spofford & Thorndike, 33 Beacon Street, Boston, Massachusetts, and 24 Livingston Avenue, New Brunswick, New Jersey.

Contract documents, exclusive of cross sections, will be furnished free of charge to each applicant sent to the Authority. The payment will not be refunded and Contract documents are not required to be returned. Plans showing grading cross sections may be examined at the office of the Authority or at the New Brunswick office of the Engineer.

* * *

CONTRACT NO. 59

The work to be performed under this Contract involves the construction of the substructures for the Trumbull Street Avenue and the Humboldt Avenue bridges and other incidental work in connection with the construction of the New Jersey Turnpike between Port Avenue and Humboldt Avenue in City of Elizabeth, Union County, New Jersey.

Principal items of work include:

Casing and Grubbing	Lump Sum
Roadway Excavation, Earth	13,000 Cu. Yds.
Sanitary Sewer Relocated	250 Lin. Ft.
Open Foundation Excavation	3,500 Cu. Yds.
Furnishing and Driving Steel Bearing Piles	3,500 Lin. Ft.
Cast-in-Place Concrete Bearing Piles	3,100 Lin. Ft.
Concrete in Pile Caps, Footings, Boats, Abutments, Wing Walls and Parapets	1,000 Cu. Yds.
Reinforcement Steel	100,000 Lbs.
Protection of Railroad Traffic	Lump Sum

Contract documents may be seen and may be inspected by prospective bidders during office hours after June 27, 1950 at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton 8, New Jersey, and at the office of the Engineers, Ammann & Whitney, 165 Raymond Boulevard, Newark, New Jersey, or 79 Ninth Avenue, New York 11, New York.

Contract documents will be furnished for $5.00 for each set upon application to the Authority. The payment will not be refunded and contract documents are not required to be returned.

* * *

CONTRACT NO. 61

The work to be performed under this Contract involves the construction of four (4) steel and concrete structures, grading, railroad trackwork and incidental work in connection with the construction of the New Jersey Turnpike, Section 3, between Metuchen and the Raritan River in Mercer and Middlesex Counties, New Jersey.

Principal items of work include:

Roadway Excavation	80,000 Cu. Yds.
Borrow Fill	1,300,000 Cu. Yds.
Concrete	11,500 Cu. Yds.
Reinforcement Steel	500,000 Lbs.
Structural Steel	2,100,000 Lbs.
Concrete Bearing Piles	3,500 Lin. Ft.
Bridge Drains	2,500 Lin. Ft.
Track Laying	3,500 Lin. Ft.
Track Raising	4,000 Lin. Ft.
Removing Tracks	1,750 Lin. Ft.
Ballast	4,000 Cu. Yds.

Contract documents may be seen and may be inspected by prospective bidders during office hours, on and after June 29, 1950 at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton 8, New Jersey, and at the office of the Consulting Engineers, DeLeuw, Cather & Company, 100 Mercer Street, Hightstown, New Jersey.

* * *

CONTRACT NO. 73

The work to be performed under this Contract involves the construction of eight (8) steel and concrete bridge structures, reinforced portland cement concrete slabs and incidental work in connection with the construction of the New Jersey Turnpike, Section 3, between Woodbridge Heights and Hartford in Gloucester, Camden and Burlington Counties, New Jersey.

Maintenance of local vehicular traffic is involved. The completion date is August 1, 1951.

Principal items of work include:

Excavation and Grading	2,000,000 Cu. Yds.
Concrete in Bridge Structures	30,000 Cu. Yds.
Reinforcement Steel	1,250,000 Pounds
Structural Steel	3,315,000 Pounds
Concrete Piles	35,000 Lin. Ft.
Timber Piles	14,000 Lin. Ft.
Metal Bridge Railing	2,000 Lin. Ft.
Pavement	2,500,000 Sq. Yds.
Topsoiling	1,000,000 Sq. Yds.
Pipe Conduit	2,500 Lin. Ft.

Contract documents may be seen, and may be inspected by prospective bidders during office hours, on June 29, 1950 at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton 8, New Jersey, and at the offices of the Engineers Ammann & Whitney, 165 Raymond Boulevard, Newark, New Jersey, and at the offices of Fleming Corderey and Carpenter, Inc., 30 North Second Street, Harrisburg, Pennsylvania and Barrington Airport, Barrington, New Jersey.

Contract documents will be furnished for $5.00 for each set upon application to the Authority. The payment will not be refunded and Contract documents are not required to be returned.

* * *

Proposals for these contracts will be received at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton, N. J., until 10:00 o'clock (DST) in the morning, and thereafter in the Veterans Room of the War Memorial Building, Memorial Drive at Willow Street, Trenton, N. J. until 11:00 o'clock (DST) in the forenoon of the following dates, at which latter time and place they will be publicly opened and read: Contract No. 52 on July 11; Contract No. 58 on July 14; Contract No. 59 on July 13; Contract No. 61 on July 12 and Contract No. 73 on July 19.

The letting and opening of proposals is subject to prequalification of the bidder in accordance with the regulations adopted by the New Jersey Turnpike Authority. Bidders must also submit with their proposals a revised financial statement and a statement of plan and equipment.

Proposals must be made upon the standard proposal forms in the manner designated in the Standard Specifications for Construction of the New Jersey Turnpike, and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and the number of the Contract on the outside and must be accompanied by a certified check drawn to the order of the New Jersey Turnpike Authority and a proposal bond, each for not less than five (5) percent of the amount of the proposal for which the amount of the bond is more than $500,000.00, and must be delivered at the above place on or before the hour named. Copies of the proposal forms to be used for submitting proposals, of the form of proposal bond, of the form to be used for financial statement and plan and equipment statement and also of the form with proposal and special addressed envelopes are furnished to bidders upon which the Contract documents.

Contract will be awarded or proposals rejected within fifteen (15) days from the date of opening proposals. The right is reserved to reject any or all proposals.

NEW JERSEY TURNPIKE AUTHORITY
PAUL L. TROAST
Chairman

(Continued on page 110)

CONTRACTORS

Watch this Section

for New Projects

Publish your announcement thru the "Proposals Section" of Engineering News-Record and get their bids.

U. S. Government
(Continued from page 109)

Department of Commerce, Bureau of Public Roads, June 28, 1950. SEALED BIDS will be received at the office of the Bureau of Public Roads, First National Bank Building, Florence, Alabama, until 10:00 a.m., C.S.T., July 25, 1950, for the construction of Project 3A-3M12, Natchez Trace Parkway, Attala and Leake Counties, Mississippi. Length, 13.432 miles. The approximate quantities of the more important items are as follows: 132,000 Cu. Yd. Type I-2 Hot Asphalt Concrete Pavement and 17,000 Cu. Yd. Furnishing and Placing Loamy Topsoil. Minimum wage rates have been fixed as required by law. For maps and specifications, a deposit of $5.00, cash or certified check made payable to the Treasurer of the United States will be required to insure their return within 15 days after the opening of bids. Plans, specifications and proposal forms may be obtained from the Bureau of Public Roads offices, First National Bank Building, Florence, Alabama, or 1410 Colonial Pike, Arlington, Virginia. H. J. Spelman, Division Engineer. (8500)

OFFICIAL PROPOSALS

Bids: July 12, 1950 (8414)

State Road Work

STATE DEPARTMENT OF PUBLIC WORKS
BUREAU OF CONTRACTS & ACCOUNTS
ALBANY, N. Y.

Sealed proposals will be received by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., until ten-thirty o'clock A.M., Advanced Standard Time, on WEDNESDAY, JULY 12, 1950, for projects in the following counties:

County	Depos. Ref. place depos.		Type	Miles	Engineer's estimate
Bronx	$50	$10,000	Lighting and Misc. Work	4.94	$ 20,000
Erie	50	55,000	8" Conc. Conc. Pav. 40' Wide Misc. Work, 4 R. R. Sep. Structures, Pedestrians, 65°, 85°, 90°, 64°, 17°, and 65° 3" Fa.	6.85	1,565,000
Kings	25	34,000	Rd. Mac. M. M. Misc. Work	1.57	613,000
Madison	50	125,000	9" Conc. Conc. Pave. 2 at 25° Web Conc. Encl. Box Culv. 12'-3" Fa. Conc. Box Culv. 20' Span 4 Sp. Alpha I. Beam 42" I Total This project involves the use of Alpha Composite Construction which is patented and the royalty is $136	3.18	2,350,000
Monroe	10	4,500	Traffic Signal Sys.	2.30	83,000
	100	140,000	Elec. Conn. Opt. Conc. Fdn. & Appr. Conc. Type 2A on Drives, Appr. Type 2B Walks 4' & 5' Alpha I Beam	3.68	2,505,000
			This project involves the use of Alpha Composite Construction which is patented and the royalty is $134		
Nassau	50	65,000	Traffic Divider & Misc. 8" Conc. Conc. Pavement Var. Width	10.15	1,199,000
Wayne Pa. & Sull., N. Y.	15	50,000	Appr. Conc. Type A Opt. Pres. Truss 4 Spans 235' Fa.	0.43	861,000

Use, ... be used, ... cost of ...

County	No.	Name	Miles	Type	Depos.	Engineer's est.
Bronx	30-4	FABRI Road-Parkway Southerly Extension	4.94	Lighting and Misc. Work	$10,000	$ 20,000

Maps, plans, specifications, and estimates may be obtained at the office of the Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the

OFFICIAL PROPOSALS

office of the District Engineers in whose district the roads are located. The name and address of the District Engineers will be furnished on request and may be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated below. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Requests for contract proposals must be submitted on separate signed slips with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check pending the awarding of the contract and bond shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidder must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated. The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

Bids: July 18, 1950 (8483)

Strengthening & Repairs to Spans

SEALED proposals addressed to the President and Trustees of the Village of Ossining for:

STRENGTHENING & REPAIRS TO WEST APPROACH SPANS OF SECOR ROAD

will be received at the office of the Village Clerk, in the Municipal Building, Ossining, N. Y., until 8 o'clock P.M. prevailing time on TUESDAY EVENING, JULY 18, 1950, at which time they will be publicly opened, read and compared.

Copies of the plans, form of proposal, specifications, bond and contract may be obtained from FRANK W. BECKER, SUPT. of STREETS, 2 Brandreth Street, Ossining, N. Y., Telephone Ossining 2-2529, upon deposit of Five ($5.00) Dollars which will be refunded upon the return of the plans in acceptable condition within fifteen days of the bidding date.

Consideration for awarding this contract will be given on the basis of the time of completion.

The right is reserved to reject any or all bids.

By order of the President and Trustees, Village of Ossining, N. Y.

FREDERICK T. SCHIMA, Village Clerk
Dated: Ossining, N. Y.
June 29, 1950

Bids: July 11, 1950 (8430)

Removal of Existing Bridge Structure

HIGHWAY BRIDGE LITTLE RIVER
ROCKFORD, BLOUNT COUNTY,
TENNESSEE

Sealed bids for the removal of the existing bridge structure across the Little River at the South edge of the town of Rockford, Blount County, Tennessee and for the construction of a new highway bridge at the same site will be received until 2:00 P.M., July 11, 1950 in the office of the County Judge, Court House, Maryville, Tennessee, and then and there publicly opened and read aloud.

The work shall include:

1. The dismantling of the present bridge structure.
2. The disposal and the removal of the material in this structure in a manner satisfactory to or as directed by the Engineer.
3. The construction of a new bridge.

The principal items of new work to be done and materials to be furnished and incorporated therein are approximately as

OFFICIAL PROPOSALS

Substructures
- 435 Cu. Yds. of Concrete, Class "A"
- 75,775 Lbs. of Reinforcing Steel
- 120 Lin. Ft. of Steel H. Piling

New Superstructure
- 480 Cu. Yds. of Concrete, Class "A"
- 42 Cu. Yds. of Concrete, Class "
- 193,862 Lbs. Reinforcing Steel
- 2,350 Lbs. of Metal Handrail
- 6,507 Lbs. of Expansion Rollers, Fixed and Associated Steel
- 5,579 Lbs. of Expansion Plates, Elastomeric
- 1,000 Cu. Yds. of Embankment [illegible]
- 126 Cu. Yds. of Rip-Rap

Copies of these Specifications and Proposals may be obtained at the office of the County Engineer, Court House, Maryville, Tennessee upon payment of Twenty-five ($5.00) dollars per copy which will be refunded when the copy is returned in good condition.

Each proposal or bid must be accompanied by a cashier's or certified check on a duly organized Bank made out to Blount County, Tennessee, or a bid bond executed by the bidder and a Surety Company authorized to transact business in the State of Tennessee, in the sum of not less than five per cent (5%) of the total amount of the bid. Said check or bond will be returned to the unsuccessful bidder as soon as the contract has been awarded, or all bids rejected, and to the successful bidder as soon as he has executed the contract and furnished a liability and property damage bond in the amount of fifty per cent (50%) of the contract price, same having been approved by the County Attorney and after the contract has been executed by the County.

All bids must be made out on the proposal as required by Chapter 135 of the Public Acts of 1935 of the General Assembly of the State of Tennessee. Bidders name and license number must be placed on the sealed envelopes containing the bid.

All bids must be made on the proposal form found in the documents. No interlineations, additions or deletions shall be made in the proposal form by the bidder.

Time of the completion of the work is the number of days contract and the number of working days required by the bidder to do and complete the work shall be stated on the proposal form where so called for. The successful bidder shall be required to complete the work within the time stipulated by him. Liquidated damages for delays shall be thirty ($30.00) dollars per day.

The Blount County Highway Commission reserves the right to waive any informalities in or to reject any or all bids or to accept any bid which they deem to be the most favorable to the interests of the County.

CHAS. D. ROBERTS,
County Judge,
Blount County, Tennessee

Bids: July 10, 1950 (8374)

Elevated Steel Water Tank

Sealed bids will be received until 3 o'clock A. M., July 10, A.D. 1950, in the office of the City Auditor and Clerk of Fort Lauderdale, Florida, for Elevated Steel Water Tank for the Waterworks System.

This work involves the installation of one (1) 500,000 gallon elevated steel water tank of tubular tower construction.

Bidding blanks may be obtained from the office of the City Engineer. Plans and Specifications for the work are on file in the office of the City Engineer, and copies thereof may be obtained at the office of the City Clerk upon payment of $25.00 for each set. Any bidder upon returning each set promptly and in good condition, will be refunded his payment, and any non-bidder, upon so returning his set, will be refunded $15.00.

A certified check for 5% of the bid, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal as evidence of good faith and responsibility of the bidder. This check shall be retained by the City of Fort Lauderdale as liquidated damages should the bidder fail or refuse to enter into a contract with the City of Fort Lauderdale for the execution of the work embraced in the proposal in the event the proposal of the bidder is accepted.

The City of Fort Lauderdale reserves the right to reject any or all bids.

P. D. RANKINS
City Manager

SEARCHLIGHT SECTION

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$1.20 cents a line, minimum 4 lines. To figure advance payment count 5 average words as a line.
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The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by July 10th at the New York Office 330 W. 42 St., N. Y. 18, will appear in July 20th issue subject to space available

WANTED
CONSTRUCTION ENGINEER-SUPERINTENDENT

for Contracting firm specializing in all types of sewer construction. Must know costs, and be able to lay out and supervise work. Reply, giving experience, age, date available, salary desired.

Good opportunity for an aggressive man, willing to work, and looking to the future. Bonus Participation.

UNITED FOUNDATION CORP.
RIDGELY, WEST VIRGINIA
Phone 6672

Experienced structural steel detail
Draftsmen and Checkers

Apply, giving age, experience, and salary required.

SOUTHERN ENGINEERING CO.
Box 1087 Charlotte, N. C.

CITY OF DETROIT

Detroit Civil Service Commission
1501 Water Board Bldg.
735 Randolph Street, Detroit 26, Mich.

STRUCTURAL DRAFTSMEN

Needed several First Class experienced detailers and checkers. Only those with previous structural fabricating shop experience need apply. Give complete information to Personnel Dept.

Consolidated Western Steel Corp.
Orange, Texas

PROJECT MANAGER

Wanted who can handle dam construction in its entirety, grading, dewatering and concrete work. For the right man we have a good job and appropriate salary.

P-7092, Engineering News-Record
330 N. Michigan Ave., Chicago 11, Ill.

SURVEYOR-DRAFTSMAN
25—35

To take charge of small office in established Engineering Co. (opportunity to enter Col

THOMAS J. TAYLOR
Box 49 Brant Beach, N. J.

ESTIMATOR—EXPEDITOR

Civil Engineer wanted by established Central Ohio General Contractor specializing in Commercial, Industrial and Public Works buildings.

Must have experience with same type of Contractor.

UNUSUAL OPPORTUNITY FOR ADVANCEMENT

Write giving full particulars of qualifications, age, detailed experiences, salary expected, first letter.

JOSEPH SKILKEN & CO.
44 E. Broad St. Columbus 15, Ohio

GRAVEL PLANT SUPERINTENDENT

Wanted for operating and managing portable and permanent plants in Indiana and Michigan. State experience, references and salary.

P-6206, Engineering News-Record
330 N. Michigan Ave., Chicago 11, Ill.

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SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the ethical personnel service that seeks employer confidence and reputation. The procedure of highest ethical standards, is individualized to your personal requirements and designed positively without obligation on your part. Your identity is assured and a report protected. Send only name and address for booklet.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N.Y.

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POSITIONS WANTED

(Continued on the following page)

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Large engineering firm wishes to acquire several complete plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible, strictest confidence.

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1474 Broadway New York 18, N. Y.

POSITIONS WANTED

(Continued from preceding page)

SANITARY ENGINEER-Executive. Masters Degree, P.E. licensed. 28 years intensive experience in field and supervision of municipal water purification, specifications and reports on water supply, water treatment, sewage and waste treatment and disposal, flood control, etc. Can furnish references relating ability to handle men and produce results on projects from inception to completion. EW-6565, Engineering News-Record

TRAILER MECHANIC. Diesel Mechanic, 7 years experience on Marine and Stationary Diesels R.R.C. engines, fuel pumps and injectors. Available immediately. Go anywhere. EW-6564, Engineering News-Record

PART TIME WORK WANTED

STRUCTURAL DESIGNER. Licensed P.E., 25 years experience bridges, industrial buildings, miscellaneous structures, wants free lance work in St. Layout, investigations and estimates. EW-6563, Engineering News-Record

ENGINEER SKILLED in: designer. Knowledge of materials, costs and contracting practices. Registered 5 states. Let's discuss your needs. Inq. 802 Philadelphia, Pa.

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SALES ACCOUNTS Wanted. Previous experience selling to engineers desirable. Big city. Variable commission. Graduate civil engineer. P.O. Box 1441, Columbus, O.

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Patent Practice

before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" for inventors sent free on request. Williamson & Hammond, Registered Patent Attorneys, Suite 614, 815 15th Street, N.W., Washington 5, D. C.

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MUrray Hill 5-7317 Founded 1922

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L.B.SMITH INC.

OFFERS

SHOVELS—CRANES

Lorain 77 diesel powered 1½-yd shovel & crane. Caterpillar D13000 engine.
P&H 625A 15-ton crawler crane.
Mcrion 25-ton diesel powered heavy duty truck crane on heavily reinforced Mack.
Brownhoist 1-yd gas shovel and crane.
Lorain 30 combination ½-yd shovel, hoe & clam.
P&H Model 150 ½-yd truck crane on 6x4 Mack.
P&H Model 100 ⅜ yd shovel.
Universal truck crane.

SHOVEL & CRANE ATTACHMENTS

Lorain 75B-77 1½-yd shovel attachment rebuilt.
Chain crown L-41 shovel attachment, new.
P&H 203 shovel attachment.
Chain crowd Lorain 30A shovel attachment.
Lorain 40 Hi-Lift shovel attachment.
Bucyrus-Erie 30B tunnel front attachment.
Koehring 301 dragline fairlead.
50' crane clam boom, 1¼ or 1½-yd.

Backhoe Buckets & Attachments

¾-yd Lorain, 40, LBS #6105, 44" cutting width, teeth, sheave.
27" outside width drop bottom type LBS #1033, good condition.
26" outside width solid bottom type LBS #4377, good condition.
¾-yd Amsco 40" cutting width, LBS #8101.
Lorain 30 hoe attachment.

NEW TAGLINES

McCaffrey Model 648 for 1¼ to 2-yd crane.
McCaffrey Model 636 for ¾-yd to 1-yd crane.

SHOVEL DIPPERS

Lorain 41, ¾-yd, LBS #7433, new condition.
New Lima 1-yd, Amsco, LBS #2295.
Bucyrus-Erie 1¼-yd gas air, LBS #3782, fair.
Lorain 75 manganese 1¼-yd, LBS #7233, teeth and bail.
Lorain 75B, 1¼-yd extended lip, 1¼-yd LBS #2260.
Pettibone-Mulliken 2-yd Lorain 82 or 820, manganese, LBS #5361.
Pettibone-Mulliken 2-yd for 3500 Manitowac LBS #5763.

CLAM—DRAG—SCRAPER BUCKETS

AIR COMPRESSORS

Ingersoll-Rand 105 cubic foot, Waukesha gasoline power, on two rubber tires.
Gardner-Denver 105 cubic foot with air receiver, hose reel, driven by power take-off and mounted on 1941 Ford.
Gardner-Denver air-cooled 105 cubic foot with air receiver, V-belt drive from power take-off and mounted on 1942 Ford chassis with Wood two-yard dump body.
LeRoi 2-stage 105 cubic foot air-cooled, skid mounted, built-in tool boxes, hose reels and hose.
Gardner-Denver two-stage 160 cubic foot skid mounted.
Schramm 210 cubic foot with International UD14 diesel on steel wheels.
Worthington 210 cubic foot, two-stage, air-cooled, on steel wheels with Hercules diesel.
Gardner-Denver 315 cubic foot two-stage, skid mounted, Murphy four-cylinder diesel.
Pennsylvania 12" x 10" class 3A single cylinder, 355 cubic foot P.D., flat belt driven 50 HP slip ring motor.
New Gardner-Denver 500 cubic foot two-stage water-cooled, D13000 Caterpillar diesel on 4 pneumatics. Used 2 months.
Worthington two-stage, water-cooled, vertical 250# 60 CFM, new condition.

QUARRY EQUIPMENT & BINS

Cedarapids BBB 1036 Scalper.
18 x 36 Farrell deep jaw crusher.
Cedarapids BBB scalping unit.
10 x 20 Beaumont Crusher.
6' Traylor Gyratory Fine Reduction Crusher.
10 x 7 Allis Chal. Blake type jaw crusher.
Cedarapids No. 1 Kubit.
60 ton 2 compartment storage bin with clam shell gates.
New 16 x 16 double clamshell gates.
20" x 6'6" Belt Type Magnetic Separator.
Conveyors—18"—24"—30"—36".

TRUCKS—TRAILERS

1½ ton Ford & Chevrolet.
2½ ton GMC. New and rebuilt.
Sterling COE Model 355GCS tandem drive tractor 9.00x24 tires, 200 HP Cummins supercharged diesel, complete with 40-ton Rogers low bed equipment trailer, 16—7.50x20 tires, airbrakes, outriggers, excellent condition.
2,000 gallon tanks on semi-trailer mounting.
New and rebuilt dump bodies.
6x6 7½-ton Reo

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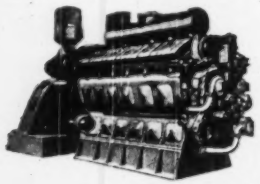

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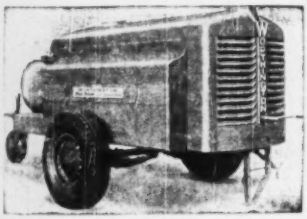

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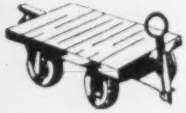

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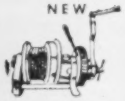

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1½"x20 ft.	6.00 net	3"x20 ft.	14.00 net
1½"x25 ft.	7.50 net	3"x25 ft.	17.50 net
1½"x30 ft.	8.00 net	3"x30 ft.	20.00 net
2"x20 ft.	8.00 net	4"x20 ft.	14.75 net
2"x25 ft.	9.50 net	4"x25 ft.	18.00 net
2"x30 ft.	11.00 net	4"x30 ft.	21.50 net
2½"x20 ft.	10.75 net	5"x20 ft.	17.50 net
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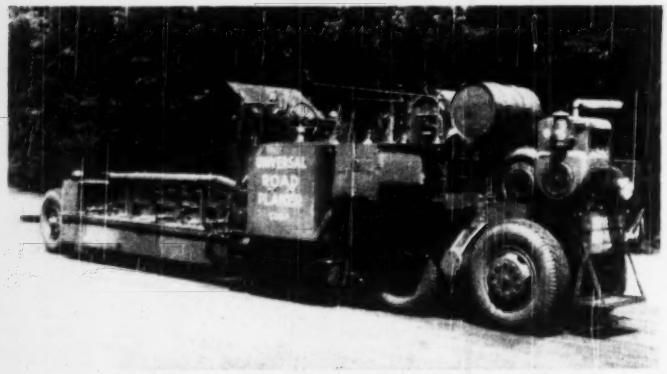

Heater Planer Improves and Maintains Bituminous Pavements

Heater Planer is designed to heat and cut to a uniform plane all rough and uneven bituminous wearing surfaces. This is accomplished by heating and planing in one operation and windrowing the planed-off material so that it can be easily and quickly removed. Heating hood is 50 in. wide by 100 in. long and is equipped with 8 oil burners. Adjustments are provided to angle the cutting blades for crown or shoulder key cutting. Working speeds range from 16 fpm. up. A consolidating blade windrows planed material. Front and rear wheels have same tread, enabling machine to cut close to curb. Overall length of the Heater Planer is 35 ft 5 in.—UNIVERSAL ROAD PLANER CORP., 83 S. High St., Columbus 15, Ohio.

Adjustable Steel Form Clamp

Comprised of stake and cross piece, the Boult clamp can be used for setting up wood forms for building foundations. It is adjustable for widths from 4 to 8 in., for heights to 24 in., and for batter from vertical to any angle. Standard steel stakes are used, and are said to prevent kicking out of forms at bottom. No special spreaders or wall ties are required. No tools are required to adjust clamps as locking level is part of each clamp. An adjustable spreader can be used with the regular stakes to set up any building foundation up to 36 in. in height and to 10 ft in width.—PATENT ENGINEERING SALES CO., 215 W. 5th St., Los Angeles 13, Calif.

Tandem-Axle Trailer

Heavy-duty tandem-axle low-bed trailer has a 40-ton rated capacity. Available with flat or drop-type platform, the new trailer is fitted with eight 20-ply 10.00x15 tires. These tires are rated at 50,000 lb capacity under the new 20-mph ratings issued by the Tire & Rim Assn. Gross load is distributed with 37,440 lb on king pin and 50,960 lb on rear axles. Total trailer weight is 11,200 lb. Walking beam supporting rear axles gives maximum horizontal and vertical oscillation of each wheel about 10 in. both ways.—LA CROSSE TRAILER CORP., La Crosse, Wis.

Portable Lubricator

One-hand-operated greasing outfits are available in two models. The Dyn-O-Lube Model 7185-A features the Dyn-O-Mite gun. This gun weighs 2 lb and holds enough lubricant to grease up to 55 bearings. The Dyn-O-Pistol Model 7165-B has a gun with a 9-oz capacity. Loading pump is mounted in a rigid steel cover which fits the top of any standard 25 or 35-lb. lubricant container. A few strokes of the pump handle fills the gun. The gun is then uncoupled and is ready for use.—ALEMITE DIV., STEWART-WARNER CORP., DEPT. G, 1850 DIVERSEY PARKWAY, CHICAGO 14, ILL.

Vertical Centrifugal Pump

Hydro-Line pump serves where net positive suction head or installation space is limited. It consists essentially of a vertical close coupled rotative shaft turbine pump enclosed in a steel jacket or barrel. Capacities up to 5,000 gpm are obtained with this pump; maximum head is 1,500 ft. All types of drives are available.—PEERLESS PUMP DIV., FOOD MACHINERY & CHEMICAL CORP., 301 W. Ave. 26, Los Angeles 31, Calif.

Welding Transformer

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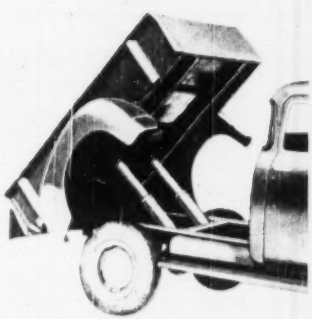

Truck Conversion Kit

Engine-driven low-mount Tipster converts pick-up trucks into dumping units. Main elements are Clutch-type hydraulic pump, steel understructure for mounting under the pick-up body, and twin-cylinder hydraulic hoist rams. The Hydro-Clutch pump is operated by a cab-mounted control. Shipped as an entire unit, the Tipster accessory weighs approximately 400 lb.—HERCULES STEEL PRODUCTS CORP., GALION, OHIO.

Aluminum Scaffold Clamp

Pipe and clamps for erection of lightweight scaffolds are now made of a new aluminum alloy. The line is

(Continued on page 122)

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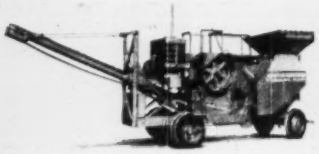


Portable Crushing Plant

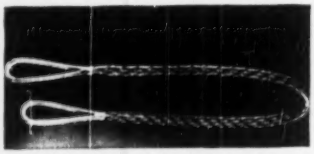
Single-pass-type plant is designed for fast, economical production of crushed rock or gravel where extreme accuracy in grading to size is not required. The Model 61 is especially suited to the maintenance needs of town and county road departments. This lightweight, portable unit features simple design and sturdy construction.—Austin-Western Co., Aurora, Ill.

Crane Has 25-Ton Capacity

Rubber-tired Thew-Lorain mi-chines, rated at 25 ton lifting capacity on outriggers at 10-ft radius, are available in two models. Both the MC-504 and MC-504W Moto-Cranes were developed by modifying the Lorain 50 Series turntable and mounting it on heavy-duty rubber-tired carriers. Turntable is powered by a gasoline engine. Power is delivered through a Twin Disc hydraulic coupling power take-off. Attachments available are: Crane boom is 100-ft length, 3-sheave boom head which permits reeving 6 parts of hoist line without top block; lifting cranc, shovel booms in 24 or 19-ft length.—The Thew Shovel Co., Lorain, Ohio.

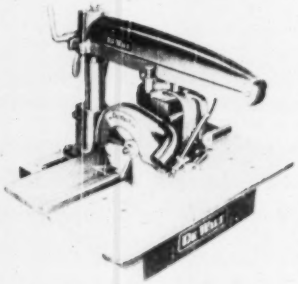
Cooling, Heating Unit

Compact packaged summer cooling and winter heating air-conditioning unit is controlled by one thermostat. The unit furnishes automatic year-round heating in winter and summer cooling by hermetically sealed refrigeration equipment. The 58B Weathermiser is produced in three models—3 hp cooling and 110,000-150,000 btu heating, 5 hp cooling and 110,000-150,000 btu heating, and 5 hp cooling and 165,000,000-200,000 btu heating. Cooling and heating elements are the same.—Carrier Corp., Syracuse, N. Y.



Flat-Braided Sling

This sling is designed to provide a relatively wide, flat bearing surface with sling thickness held to a minimum. The Drew 14-part Type I CI sling is fabricated from one endless wire rope. Sling ends terminate in natural loops fitted with Crescent thimbles. It is made to order in length and safe load capacity required.—Macwhyte Co., 2950 Fourteenth Ave., Kenosha, Wis.



Radial-Arm Power Saw

Light weight and recessed cabinet top design permits removal of saw unit, table, and table base from cabinet for using machine as a portable power saw. Weight of the entire unit is 115 lb. The Model GS is equipped with a 3 hp motor, can cut 2-in. thick material cross-cut 12 in. wide, and up to the center of a 43-in. panel.—DeWalt, Inc., Lancaster, Pa.

Concrete Form Clamp

Taper-Lyc continuous-tied concrete form clamp features fast installation and adjustment; easily removed from concrete because of its tapered construction; eliminates twisting and unscrewing of rods imbedded in concrete; does not require reassembly after stripping; eliminates threaded tie rods; and tapered hole is grouted in filling from large end. The Taper-Lyc is made in one length which is adjustable for wall widths ranging from 6 to 14 in. By using standard die bolts onto the end of the rod,

(Continued on page 124)

ALUMINUM

SOLVES MANY TOUGH PIPING PROBLEMS

In recent years, aluminum and aluminum alloys have grown rapidly in importance as piping materials in many industries, including manufacturers of chemicals, foods, soaps and cosmetics, petroleums, textiles, explosives, rubber, paints and varnishes.

There are many reasons for this. Aluminum offers high strength, light weight, passivity when in contact with various corrodents, resistance to corrosion, absence of sparking characteristics, and low cost in comparison with other metals that have the same inherent qualities.

For example, in chemical plants, aluminum offers great resistance to corrosion, and it is passive to a large number of corrosive fluids where other metals tend to catalyze. Its corrosion products do not cause discoloration. This is important where maintenance of product color is of primary importance.

In food plants, aluminum resists the corrosive action of most food products such as acetic and nitric acids, oils, milk, beer, and fruit juices. It protects against color contamination and helps prevent rancidity.

In the petroleum industry, aluminum piping resists the corrosive action of hydrogen sulfide, sour crude oils, mineral oils and liquid fuels.

Aluminum piping materials are available in a variety of alloys including 2S, 3S, 61S, 63S, and Alclad 3S. Each is particularly suited for certain applications. And, since the physical properties vary with each alloy used, individual applications should be analyzed carefully to determine the correct alloy needed for the job.

So that every user can realize the advantages of all-aluminum piping systems, and also have the benefits of greater strength, greater safety and permanently leakproof joints afforded by welded construction, TUBE-TURN Welding Fittings and Flanges can be provided in all the alloys listed above. It's the most complete line available to industry.

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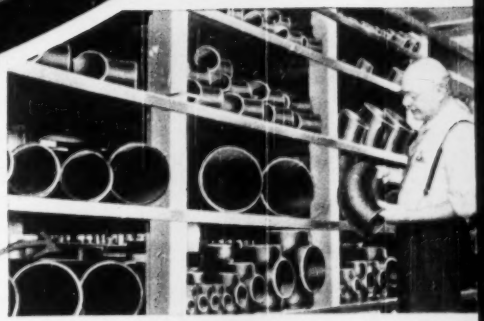

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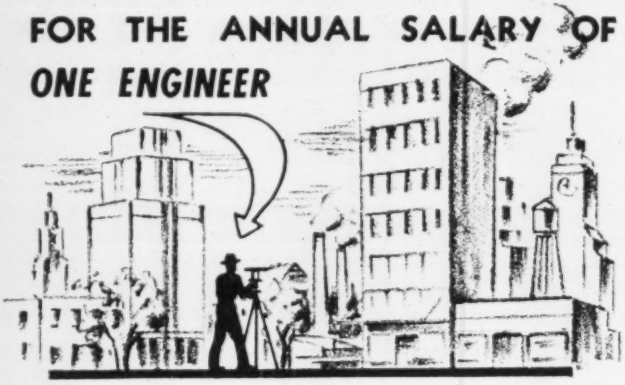

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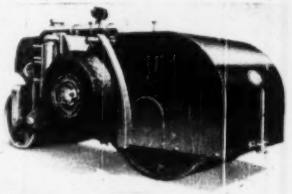
it is possible to form up to a 29-in. wall. By tieing two tapered rods together with a coupling, it is possible to form walls up to 46-in. thick.—H. J. KRUEPER CO., 535 S. CLARENCE ST., LOS ANGELES 33, CALIF.



Five-Ton Tandem Roller

Retractable-wheel self-contained roller has a full 5-ton weight. The retractable wheel permits its being towed at normal highway speeds. Two hydraulic cylinders raise and lower trailing wheels. When towed, the wheels ride 9 in. off the ground. Power for the roller is supplied by a 4-cyl gasoline engine.—HUBER MFG. CO., MARION, OHIO.

Layout Pentaprism

Ground- and drill-hole layouts, earthwork measurement, cross-sectioning work, stope surveys, foundation layouts, and other applications involving angles or multiples of 90 deg are instantly checked with the Wasatch constant deviation pentaprism. These pentaprisms give foresight images that are erect and positive. Backsite alignment is accomplished by two pairs of V-sights opposed at 90 deg to each other. The instrument is 4¾ in. long and weighs 24 oz.—Stratex Instrument Co., 1861 Hillhurst Ave., Los Angeles 27, Calif.

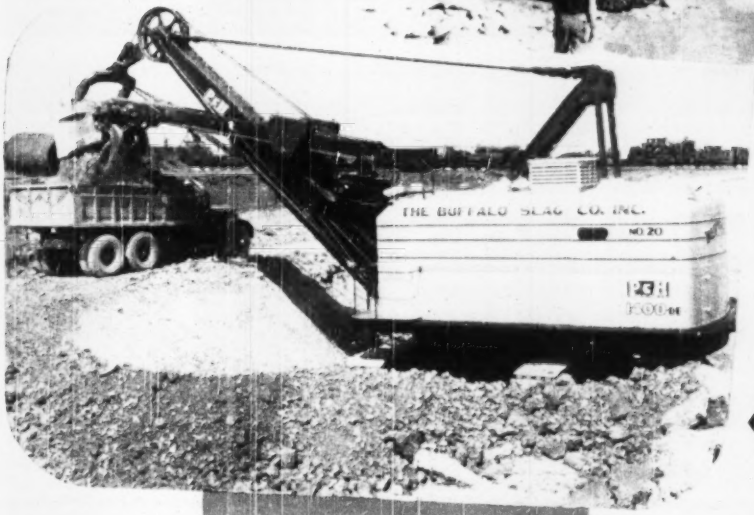
Aluminum Insulation

Intra Type 6 consists of three tough, permanently separated metals and two dense, mold- and vermin-

(Continued on page 126)

For Rock Bottom Costs From Start to Finish!

START . . . FLUXING STONE
A P&H Model 1400 Diesel-Electric (4 yd.) shovel, owned by Drummond Dolomite Inc. at Drummond Island, Michigan.



FINISH . . . BLAST FURNACE SLAG
A P&H Model 1400 Diesel-Electric shovel owned by the Buffalo Slag Co., Buffalo, New York.

P&H DIESEL-ELECTRIC SHOVELS

with *MAGNETORQUE** HOIST DRIVE

Now, you can have electric shovel efficiency *anywhere* with a P&H Diesel-Electric quarry and mining shovel. It's a complete electric shovel . . . with the addition of a diesel engine to furnish power . . . entirely independent of high line service.

Years of the toughest rock digging have proved the P&H Diesel-Electric from every standpoint . . . dependable operation . . . less maintenance . . . rock bottom tonnage costs.

This simplified P&H Diesel-Electric shovel is made possible by the exclusive P&H Magnetorque Hoist Drive. Hoist generator, hoist motor, slip friction clutch and other mechanical devices are completely eliminated. Magnetorque is only one of many P&H Added Values. Ask for Bulletin X83-DE.

Every Third P&H Electric Shovel Sold is a Repeat Order.

*Trade Mark of Harnischfeger Corporation for electro-magnetic type clutch

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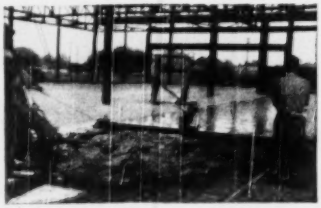

Made in lengths of 6' to 36' the new Master Vibratory Finishing Screed (Cat. No. 942) lets you use harsher, more economical mixes. Yet you get a denser, more accurate, harder-wearing concrete surface. With a Master, vibrations penetrate the entire depth and width of the concrete slab. No additional vibration needed regardless of concrete slump or amount of reinforcing steel. Write, wire or phone for prices, specifications, complete information.

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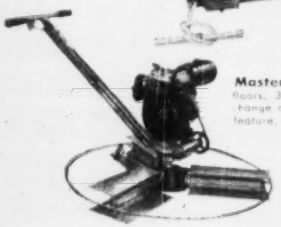

Master Turn-A-Trowel—For floating and finishing concrete floors. 34" and 48" diam. Gasoline or electric power. Instant change of trowels for floating or finishing—an exclusive Master feature. (Cat. No. 939)

Combination Disc Float and Turn-A-Trowel

Floats concrete and asphalt mastic floors with a high-speed 24" disc. Grinds floors with 16" or 22" disc. Easily converted to Turn-A-Trowel by substituting trowels for disc. (Cat. No. 939)

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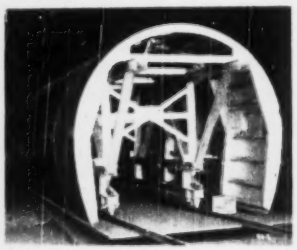

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proof fiber partitions. It is designed for installation in ceilings and floors, between beams, steel girders, or trusses; under concrete floors and ceilings; over concrete slabs; and under or over radiant-heating panels.—INFRA-INSULATIONS, INC., 10 MURRAY ST., NEW YORK, N. Y.

Portable LP Gas Torch

Instant-lighting hand torch features use of replaceable cartridge refills. The torch lights instantly without preheating; gives a clean, hot flame of 3,660-deg F.; and weighs 2¼ lb. The Bernz LP torch will burn in any position, including upside down. It operates most efficiently on propane fuel.—OTTO BERNZ CO., INC., 280 LYELL AVE., ROCHESTER 6, N. Y.

New Product Briefs

Super-rated v-belts incorporate a chemically produced fiber of high strength, low stretch, and excellent shock-absorbing qualities. The Goodyear Hy-T belt features include minimum stretch, resistance to shrinking, water and mildew resistance, and increased horsepower rating.

Variable-speed transmission for fractional-horsepower motors features automatic speed-locking device which keeps pulley in desired position. Maker: Frazier & Son, Belleville, N. J.

Silicone product is used for keeping water out of concrete and cinder blocks, patios, stucco, and sandlime brick. Stopall Type C and CP (Stopall Waterproofing Manufacturers, Inc., Kalamazoo, Mich.) permits oil painting on concrete. Coverage is up to 150 ft per gal.

Stainless-steel tubing cut-off machine handles any tube from ¼ to 2¼ in. in dia. It cuts off to an accuracy within 0.010 in. Maker: Gilman Engineering & Mfg. Corp., Janesville, Wis.

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Look at a Lorain TL-25 . . . on the job . . . compare its performance with any other 3/4-yd. machine. Watch it dig! Watch it swing! Watch it bite into tough material! You can see it's faster, more powerful, with the stamina to hang-on until the 3/4-yard dipper is heaped. Lorain TL-25's easily prove their ability to out-perform others everywhere they work. And here are "built-in" reasons that make them the leaders of their class!

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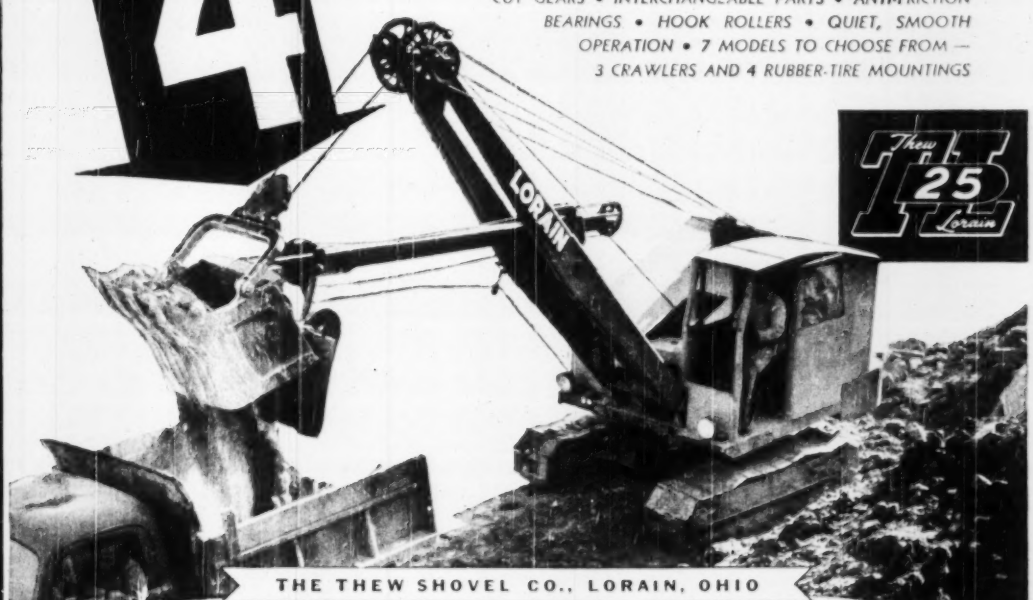

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HOES • MOTO-CRANES

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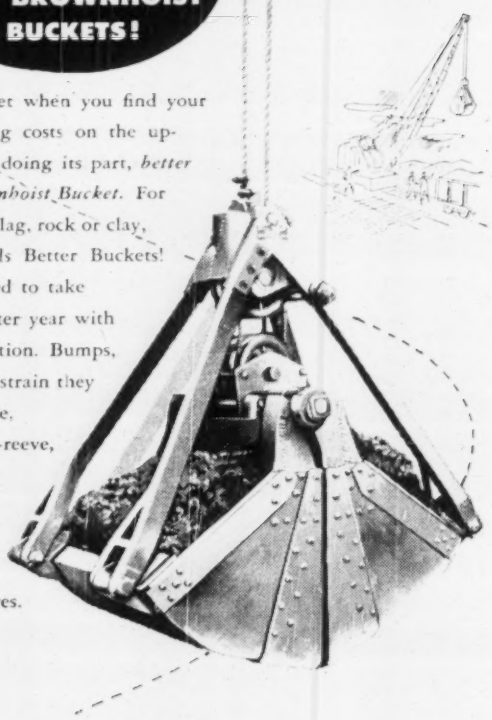

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Manufacturers' Publications

Soil Stabilizers—Job-data folder (4 pp) describes applications of the P&H single-pass soil stabilizers. The folder covers the use of the machine in road and airport work in many states and foreign countries. Feature of the folder is a large cutaway drawing explaining operation of the machine.—HARNISCHFEGER CORP., STABILIZER DIV., 4404 W. NATIONAL AVE., MILWAUKEE 14, WIS.

Weather-Resistant Coating—Roof Coating, a corrosion and weather-resistant roof coating and waterproofing for foundations, walls, and floors, is described in Catalog 501-R. Also described are Styx liquid roof paint, Styx mastic roof coating, Styx plastic roof cement, C-4 asphalt primer, Fite roof paint, Asbestite roof coating, Plastite roof cement, C-4 Blind Nailing cement, and Seal Tight foundation water proofer.—COOPERS CREEK CHEMICAL CORP., WEST CONSHOHOCKEN, PA.

Fenestra Steel Windows—New bulletins describe three types of windows. One describes the Fenestra steel basement window; another describes the Fenestra steel outside-inside trimmed residence casement window unit; and the third describes the Fenestra steel utility window. Each window is described in detail, and information is provided on proper installation procedures.—DETROIT STEEL PRODUCTS CO., 5141 GRIFFIN ST., DETROIT 11, MICH.

Silica Graphite Paint—Three new bulletins describe flake silica graphite paint and primer for protecting metal structures. These bulletins (V-53, V-55, and V-56) describe silica graphite, completely listing its principal features and explaining how it protects both exterior and interior surfaces.—JOSEPH DIXON CRUCIBLE CO., PAINT SALES DIV., JERSEY CITY 5, N. J.

Ryerson Catalogs—Eight-page bulletin describing specialized steel service for contractors features Hi-Bond reinforcing bars. Other products listed include electric-welded wire fabric, steel forms for concrete joist construction, steel spirals for reinforcement, expanded metal, reinforcing accessories, caisson rings, and others. Also available, is a 4-p bulletin on two high-performance alloy steels supplied in heat treated condition and ready to use, Ryerome

(Continued on page 130)

More mixing, less fixing with drum on TIMKEN® bearings

THIS Rex 4½ yd. Hi-discharge Moto-Mixer keeps its nose to the grindstone to speed your construction jobs. No time-wasting bearing breakdowns to worry about.

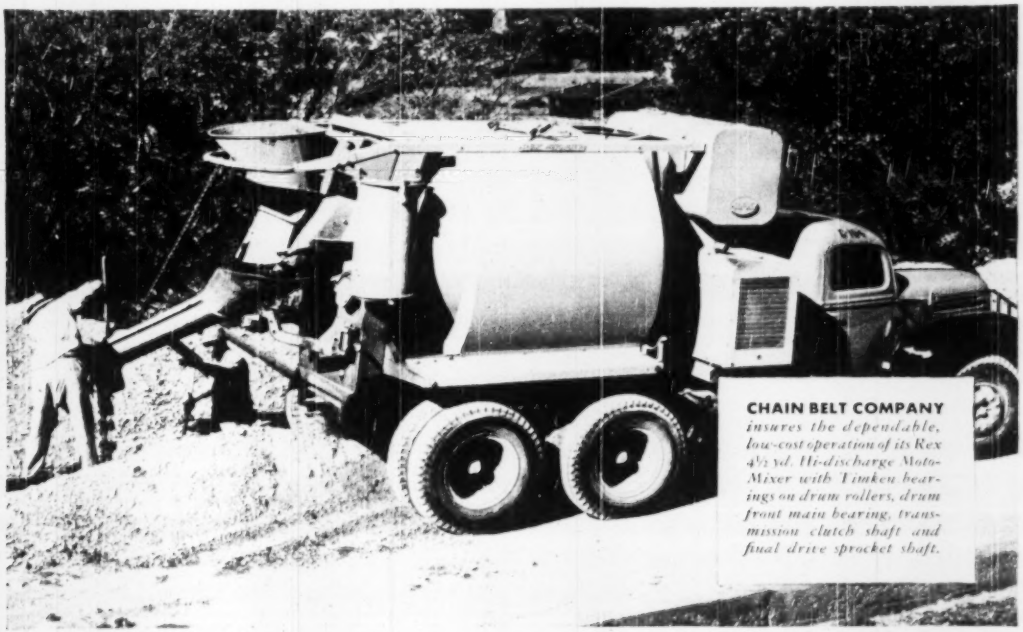
It's equipped with Timken tapered roller bearings at four vital points—mixing drum front main bearing, drum rollers, transmission clutch shaft, and transmission final drive sprocket shaft.

Timken bearings have the tapered construction that takes the drum's radial, thrust, and combination loads. They have line contact between rollers and races to carry the heaviest loads the drum can dish out. They can be expected to last the life of the mixer because they are: (1) engineered for the job, (2) made of Timken fine alloy steel for extra toughness and wear-resistance, and (3) manufactured to amazing limits of accuracy.

Timken bearings keep moving parts in rigid alignment, reduce wear and maintenance costs. They permit tighter closures to retain lubricant better and cut lubrication time. In heavy duty service like this, they reduce friction more than any other bearing.

Make sure the machines you build or buy have these Timken bearing advantages. Always see to it that your bearings are stamped with the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



CHAIN BELT COMPANY *insures the dependable, low-cost operation of its Rex 4½ yd. Hi-discharge Moto-Mixer with Timken bearings on drum rollers, drum front main bearing, transmission clutch shaft and final drive sprocket shaft.*

TIMKEN

TIMKEN

POSITIVE ROLLER ALIGNMENT

Wide area contact between roll ends and rib of the cone prevent Timken rollers from skewing. Result: bearings roll easier, last longer.

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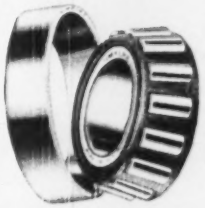
TAPERED ROLLER BEARINGS



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ENGINEERING NEWS RECORD

Sales Representatives [illegible]

and Nikrome M are suitable for heavy duty axles and shafts, gears and pinions, studs and bolts, and similar application. Data tables include minimum mechanical properties, test results, properties at high temperatures, and machinability ratings.—JOSEPH T. RYERSON & SON, INC., BOX 8000-A CHICAGO 80, ILL.

Flash Mixers; Flocculators—Bulletin (8 pp) describes the Dorreo flash mixers and flocculators. It contains photographs and complete descriptions of these units, as well as listing the advantages claimed for them. Designed primarily for pre-treatment of water supplies, they are also used in sewage treatment. The last two pages of the bulletin cover various types of Dorr sedimentation units and illustrate by photographs and drawings how the flocculator operates in combination with these units.—THE DORR CO., INC., BARRY PLACE, STAMFORD, CONN.

Concrete Cutting—Treatise on subject of cutting concrete with diamond abrasive wheels has been published in catalog form. The treatise discusses development of this type of equipment, the various Felker Di-Met concrete-cutting machines, advantages claimed for concrete cutting, methods of cutting concrete, and recommended applications. The bulletin is thoroughly illustrated with job photographs.—FELKER MFG. CO., TORRANCE, CALIF.

Allis-Chalmers Tractors—Pocket-size catalog (20 pp) discusses the importance of using equipment designed to fit job requirements. The catalog contains specifications and a brief description of each A-C power unit, wheel tractor, and crawler tractor.—ALLIS CHALMERS MFG. CO., TRACTOR DIVISION, BOX 512, MILWAUKEE, WIS.

Translucent Building Panels—Corrugated plastic panels for use in construction are described in a 4-color folder illustrating colors in which the Cornilux panels are produced. Text describes principal features of the panels and illustrations show several typical uses.—CORNELIUS CORP., P. O. BOX 6524, HOUSTON 5, TEX.

Alloy-Steel Tools—Safe-T-Kut tools listed in Bulletin 2-SK include hand chisels, pneumatic and electric hammer chisels, center punches, paving breaker steels, and back-out punches. The bulletin describes the Delsteel alloy from which the tools are produced, inspection procedures, and special designs.—DELAWARE TOOL STEEL CORP., WILMINGTON, DELA.

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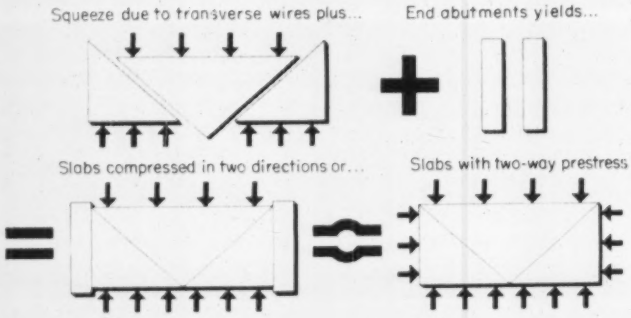
Squeeze due to transverse wires plus...
End abutments yields...
Slabs compressed in two directions or...
Slabs with two-way prestress

Progress report: Prestressed Airstrips

When Eugene Freyssinet put down the world's first prestressed concrete runway at Paris-Orly Airport nearly two years ago, he claimed that the airstrip could handle any airplane then known, and most of the biggest ships the future could bring.

Freyssinet's 1,400-ft runway, only 6-2 in. thick (ENR Sept. 16, 1948, p 104) hasn't actually had to take any 150-ton planes. But its performance makes it appear that its designer wasn't just boasting.

In fact, the only trouble with the strip is that it is too strong. It was designed to meet the challenge of bigger and bigger planes—and the challenge hasn't materialized. Biggest ships handled so far are about 70 tons (mostly Constellations). So the French feel it's a little pointless to design runways of this enormous strength—particularly since the prestressed strip cost about 30% more per meter to build in France than a conventional strip.

• **Successful experiment**—On the other hand, the runway is admittedly experimental, and as such it is an apparent success.

Freyssinet himself complained of the materials and machines he had to use to do the construction and admitted that no subsequent runway would be constructed by the same methods. The Orly runway, 200 ft wide, was built of 6-in. meter-square precast concrete blocks (an admittedly clumsy construction procedure in view of French lack of adequate handling machinery). It was prestressed by tensioning wires placed between blocks and anchored at either side of the runway. The entire runway was divided into several triangular sections by joints at 45 deg to the longitudinal axis of the strip, to make possible a two-way prestress although cables were laid in only one direction (transversely). The longitudinal prestress resulted from the fact that the ends of the runway were confined between reaction abutments and rollers in the joints permitted the triangular sections to slide past each other horizontally with little friction.

These rollers, in fact, seem to be the one kink that has developed in the strip. They have shown a slight tendency to work loose and pop up out of the joint. This could easily have been overcome by having the edges of the joint lap over tops of the rollers—and that would be done if another such strip were ever built.

• **How it's done**—When the runway was put down, the transverse cables were laid between the precast blocks. They consisted of 50 parallel 7-m. dia steel wires with an average ultimate tensile strength of 220,000 psi. At the edge of the strip, the 50-wire cables were separated into three strands, which were anchored by pinching them between Freyssinet-patented interlocking cones.

After the cables were placed, mortar was cast in the joints between slabs—lateral joints being packed full, but longitudinal joints were only filled to the bottom of the cables.

The cables were then tightened in four steps. The 240 westernmost cables were tightened first to a tension of 58,000 psi; the 180 easternmost cables were brought to the same tension; the remaining cables in the center were stressed; then all cables were jacked to a tension of 128,000 psi to impart a uniform 475 psi stress to the concrete.

The two abutments at either end of the strip are made of concrete prestressed both laterally and longitudinally. They are 200 ft long, running the full width of the runway, 6 ft wide and of varying thicknesses. They are anchored by 12 concrete buttresses, acting in tension, carrying 26 ft under the strip.

Prestressing buttress cables perpendicular to the axis of the strip are anchored at the bottom of the buttresses in concrete injected under pressure.

• **Strength tested**—Some evidence of the tremendous strength of the paving, despite its thinness, came in recent tests. Under a 300,000-lb load applied to a circle 24 in. in diameter, prestressing was lowered from the normal 475 psi to 142 psi, before cracks appeared. (The article in ENR Sept. 16, 1948, p 104, erroneously reported the prestress in the concrete as 4,750 psi instead of 475.)

The cracks disappeared completely when the prestressing cables were returned to normal tension.

Obviously, the strip isn't getting much of a workout under present service conditions.

• **Reasons for cost**—French engineers cite three main reasons for the extremely high cost of prestressing such strips in their country:

1. French raw steel prices are roughly 25% higher than average world prices, thanks to cartelization and protection of markets. And the cables used in prestressing are made by only one company—which uses its monopoly position to charge 300% more than the French price for comparable types of steel.

And there are about 62.2 lb of steel per cu yd of concrete in the Orly strip.

2. Conventional French landing runways rarely exceed 12.5 in. in thickness—enough to handle most air traffic. The relative cost of prestressed strips, therefore, is much more than it would be in the U. S., where landing strips 24 in. thick have been built.

3. French heavy construction-machinery is still primitive compared to the U. S. contractor's tools. This explains why the Orly strip was built out of precast blocks which demanded a lot of hand labor.

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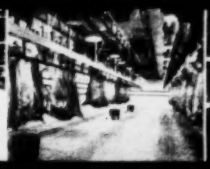

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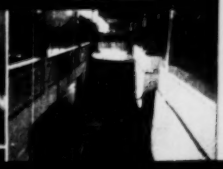
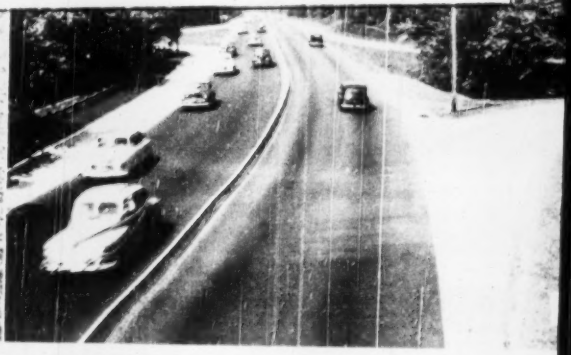


Where traffic hits a peak of 60,000-vehicles-a-day

Resurfacing part of Southern State Parkway, Long Island, N. Y., with resilient, heavy-duty Texaco Asphaltic Concrete



PHOTOGRAPHS

1. Laying the wearing surface of a two-course Texaco Asphaltic Concrete pavement on Southern State Parkway.

2. Note the skid-resistant texture of this Texaco Asphaltic Concrete pavement, which assures maximum safety to motorists.

3. The 1½-inch binder course is shown at the right and 1-inch wearing surface at the left in this photo.

4. The Texaco Asphaltic Concrete on Southern State Parkway was laid by the Standard Bitulithic Company, Baldwin, N. Y.

Southern State Parkway is part of a system of beautifully landscaped parkways, which bring Long Island's fine State parks, bathing beaches and other attractions within easy reach of New York City. During the summer, Sunday and holiday traffic on Southern State Parkway reaches 60,000 vehicles in 24 hours, with a high of 10,000 cars a day on weekdays.

Last fall, a 2½-mile section of Southern State Parkway, beginning at the New York City line, was resurfaced with a two-course Texaco Asphaltic Concrete pavement, consisting of 1½-inch binder course and 1-inch wearing surface. Its construction on an important part of this popular parkway helps explain why hot-mix, hot-laid asphaltic concrete paving has been chosen in the past by road builders throughout the country to serve exceptionally heavy traffic.

Wherever main highways, busy city streets and major airports call for pavement capable of withstanding unusually hard wear, resilient Texaco Asphaltic Concrete's rugged durability and low maintenance cost make it a sound choice.

Complete information on Texaco Asphaltic Concrete and all other types of asphalt construction for streets, highways and airports can be secured without obligation by writing our nearest office.

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